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Dr P. JANSEN (1882—1955)

On April 2nd of this year Dr P. Jansen, agrostologist and honorary member of the staff of the Rijksherbarium, suddenly passed away at Amsterdam, 73 years old.

Pieter Jansen was born at Rotterdam on January 25th, 1882. Trained to be a teacher, his appointment as such followed in 1900. His study in mathematics soon led to his appointment to a secondary school at Rotterdam and afterwards, in 1912, to the Municipal Training School for Teachers at Amsterdam, of which he filled the post of director from 1936 until his retirement a few years ago.

Beside his extensive educational task and his studies in mathematics, Jansen spent much of his time on botanical work, especially with regard to the flora of the Netherlands. From this work resulted a considerable number of papers, mainly on Gramineae, and an important herbarium. The greater part of these papers was published in collaboration with his friend and colleague Wachter. Their large common collection is known as the herbarium Jansen & Wachter. It has been incorporated now in the Rijksherbarium.

Most of Jansen's papers on Dutch grasses may be found in the series entitled "Floristische Aanteekeningen", "Grassen langs de Zuiderzee", and "Grassen om het IJselmeer", all in "Nederlandsch Kruidkundig Archief". Others have been published in "De Levende Natuur". Moreover the Gramineae for the second edition of "Prodromus Florae Batavae" and for several editions of Dutch flora's have been revised by him. The instalment on Gramineae of "Flora Neerlandica", which saw the light in 1951, may be regarded as an extensive recapitulation of his studies on Dutch grasses.

In the last few years the grasses of Malaysia especially drew Jansen's attention. Some of his papers on this subject had already been published in "Acta Botanica Neerlandica" and in "Reinwardtia", but a large revision of the Malaysian species for "Flora Malesiana" was still in preparation at the time of his death. Fortunately others will continue the work on this difficult family.

On account of his important work in relation to the Netherlands Botanical Society Jansen was appointed a honorary member of this society in 1945. In the next year the degree of *doctor honoris causa* was granted to him and to his fellow-botanists and friends Kloos and Wachter by the Leyden University in connection with their important botanical studies.

An active life was cut off, a life devoted to his family, his friends, his pupils, his comprehensive work, his hobbies. We shall miss him at the meetings of the floristic section of the Botanical Society, of which section he was secretary for many years.

S. J. VAN OOSTSTROOM.

STUDIES IN OLD WORLD PROTEACEAE

by

H. SLEUMER

(Flora Malesiana, Leyden)

(Issued 31. XII. 1955)

Page

I. The genus *Grevillea* R. Br. in Celebes 2
II. A survey of the genus *Macadamia* F. v. M. 3
III. The genus *Gevuina* Mol. in Australia and New Guinea 5
IV. A second species of the genus *Hicksbeachia* F. v. M. 6
V. A revision of the genus *Helicia* Lour. 7
VI. *Heliciopsis* Sleum., a new genus of the *Proteaceae-Grevilleeae* 79

During a recent treatment of the Proteaceae for "Flora Malesiana" it has become evident that a revision of the generic status of all proteaceous taxa reported from S. Asia and Malaysia as well as from the adjacent regions of Micronesia, Melanesia, Polynesia and subtropical-tropical Australia had to be made to reach a satisfactory correlation of the genera and species concerned as a basis for the discussion of phytogeographical relations both within and outside the proper Malaysian area. During this work it appeared necessary to transfer some species to other genera. A revision of the genus *Helicia* showed that a group of species had to be segregated as a distinct new genus *Heliciopsis*.

My studies are based on herbarium specimens borrowed from the following Institutions: Arnold Arboretum (A), Bot. Mus. Berlin-Dahlem (B, where the type-material of the family remained intact), Bogor (BO), Brisbane (BRI), Calcutta (CAL), Edinburgh (E), Florence (FI), Kepong (KEP), Lae (LAE), Leiden (L), Melbourne (MEL), München (M), New York (NY), Manila (PNH), Singapore (SING), Stockholm (S) and Utrecht (U). The material preserved in the British Museum (BM), at Kew (K), and Paris (P) has been studied during a stay at London and Paris.

I. THE GENUS GREVILLEA R. BR. IN CELEBES.

Grevillea elbertii Sleum. sp. nov. — Arbor 10—17 m. Ramuli teretes, apicibus adpresse ferrugineo-sericei. *Folia* simplicia, ovato-oblonga vel obovata vel oblonga-elliptica, apice ± rotundata glandulaque minuta terminata, interdum retusa, basi in petiolum cuneata, coriacea, supra glabra, in sicco viridi-olivacea, subnitida, subtus juniora aureo-ferrugineo-sericea, matura partim glabrescentia et in sicco brunnea, margine undulata, integra, (5—)6—12(—18) cm longa, 2.5—6(—7) cm lata, in medio vel parum supra medium latissima, costa utrinque imprimis subtus prominente, nervis lateralibus pinnatis 7—9(—10) primariis angulo acuto a costa abeuntibus inter sese praeter marginem arcuato-conjunctis utrinque prominentibus, aliis minus distinctis intercalaribus, venis venulisque valde obliquis rete sat densum utrinque prominulum formantibus; petiolus sat crassus paullo applanatus 1—1.5(—2) cm longus, sericeus. *Paniculae* terminales breviter pedunculatae, c. 12—15 cm longae e racemis divaricatis compositae, racemis breviter pedunculatis inferioribus c. 6—8(—10) cm longis densifloris. *Rhachis* sat crassa ferrugineo-sericea. *Bracteae* minutissimae, caducae. *Pedicelli* solitarii vel gemini, crassiusculi, 2—3 mm longi, apice parum incrassati. *Torus* parum obliquus. *Perianthium* dilute viride, extus cinereo-sericeum, intus papillosum, cum limbo 8 mm longum, infra limbum globosum arcte recurvatum. *Glandula hypogyna* semiannularis. *Gynophorum* 3 mm longum, sicut ovarium glabrum. *Stylus* subgracilis glaber, apice in discum stigmatiferum lateralem incrassatus. *Folliculi* maturi oblique ellipsoidei, compressi, c. 3 cm longi, 1.8—2 cm crassi, crasse et c. 3—5 mm longe stipitati, pedicello fructifero in crassato 4—5 mm longo.

CELEBES. S E. Celebes, Isl. Kabaena, Mt Sangia-wita, 600—700 m: *J. Elbert 3475* (A; L, typus; PNH, SING), fl. fr. Oct. 1909; ibid., 700—900 m: *J. Elbert 3491.* E. Central Celebes, Malili, Waru-waru: *G. Kjellberg 2419*, sea-shore, fr. Oct. 1929; Paka (Lampla), 3 m: *NIFS bb. 19710*, fl. fr. June 1935.

II. A SURVEY OF THE GENUS MACADAMIA F. v. M.

Helicia heyana Bail. differs manifestly from all other Australian species of the genus by its numerous nerves joined in an intramarginal one and by its pyramidal-conical stigma. The investigation of the ovary (*Kajewski 1290*) has shown, that the 2 ovules are orthotropous, hanging from the top of the cell. *H. heyana* therefore cannot belong to *Helicia*, but fits very well in *Macadamia*.

Species similar to *Helicia heyana* in nervation are *Roupala francii* Guillaum. and *R. vieillardii* Brongn. & Gris from New Caledonia, which do not belong to *Roupala*, a purely South American genus, revised recently by myself (Bot. Jahrb. 76, 1954, 141). It is known since a long time, that both species and *Roupala rousselii* Vieill., also from New Caledonia, have orthotropous ovules, hanging from the top of the cavity, which points to *Macadamia*, though, unfortunately, the structure of the fruits of these 3 New Caledonian species is unknown. I assume they should be assigned to *Macadamia* with which they agree in floral characters.

In the new circumscription the genus comprises 9 spp., 5 of them in Australia, 3 in New Caledonia, and 1 in Celebes. I give here a key to the species and an enumeration of the material seen from various herbaria.

Clavis specierum

1. Racemi terminales numerosi, e verticillo foliorum orti, vel, foliis illis ad bracteeas reductis, quasi in apice pedunculi crassi (re vera in apice internodii ultimi) dispositi 2
1. Racemi axillares rarius subterminales, plerumque solitarii, rarius bini . . . 3
2. Pedicelli 2 mm longi. Perianthium c. 4 mm longum. — *NE. Queensland* **1. M. whelani** (Bail.) Bail.
2. Pedicelli 5—6 mm longi. Perianthium 7—11 mm longum. — *Celebes* **2. M. hildebrandii** Steen.
3. Folia 3—4-verticillata, vel, praecipue inferiora, sub-opposita (integra vel spinoso-dentata) 4

3. Folia alterna (semper integra) 5

4. Inflorescentia sparse subadpresse puberula. Folia in specim. junior. spinoso-dentata (dentibus utroque latere usque ad 10), in specim. vetustior. integra, nervis lateralibus utroque latere 7—12; petiolus 4—15 mm longus. — *S. Queensland*; culta **3. M. ternifolia** F. v. M.

4. Inflorescentia subvilloso-pubescens. Folia semper regulariter spinoso-dentata (dentibus utroque latere 35—40), nervis lateralibus utroque latere 13—20, subsessilia vel usque ad 2 mm longe petiolata. — *N. New S. Wales, S. Queensland*; culta **4. M. tetraphylla** Johns.

5. Inflorescentiae 40—60 cm longae. Folia sessilia, 60—75 cm longa, regulariter 3—5-loba. — *New Caledonia* . . . . . . **5. M. rousselii** (Vieill.) Sleum.

5. Inflorescentiae usque ad 30 cm longae. Folia petiolata, usque ad 45 cm longa, simplicia vel interdum breviter 3-loba 6

6. Petioli elongati, 3—6 cm longi 7

6. Petioli breves, raro usque ad 1.5 cm longi 8

7. Folia subtus densissime prominulo-reticulata, margine valde manifeste cartilaginea. — *New Caledonia* . . . . . . **6. M. vieillardii** (Brongn. & Gris) Sleum.

7. Folia subtus subdense prominulo-reticulata, margine haud vel obscure cartilaginea. — *New Caledonia* . . . . **7. M. francii** (Guillaum.) Sleum.

8. Folia in sicco flavescentia vel dilute brunnescentia. Inflorescentiae sat dense appresse ferrugineo-pilosae. Perianthium c. 14 mm longum. — *N. New S. Wales, S. Queensland* . . . . **8. M. praealta** (F. v. M.) Bail.

8. Folia in sicco nigrescentia. Inflorescentiae glabrae. Perianthium c. 24 mm longum. — *NE. Queensland* . . . . **9. heyana** (Bail.) Sleum.

1. M. whelani (Bail.) Bail., Queensl. Fl. 4, 1901, 1330, pl. 57, fig. 2; Compr. Catal. 1913, 440. — *Helicia whelani* Bail., Rep. Exp. Bellend.-Ker 1889, 55, diagn.; Syn. Queensl. Fl. Third Suppl. 1890, 61.

Australia. NE. Queensland. Bellenden-Ker: *Bailey* (K); ibid., 365 m: *Podenzana* (BM, fr.). Tringilburra Creek: *Bailey* (BM, K, fr.). Mossman River: *Brass 2135* (K), rain-forest.

2. M. hildebrandii Steen., Reinw. 1, 1952, 475.

Celebes. For an enumeration of localities and collectors see reference.

3. M. ternifolia F. v. M., Trans. Phil. Inst. Vict. 2, 1858, 72, tab.

Australia. S. Queensland, in lowland rain-forest. For an enumeration of localities and collectors see Johnson, L. A. S., Proc. Linn. Soc. New S. Wales 79, 1954, 15—18.

M. lowii Bail. (Queensl. Agric. J. 26, 1911, 127) and *M. minor* Bail. (Queensl. Agric. J. 25, 1910, 11) are, in most of their characters, especially in the subappressed, rather sparse tomentum of the inflorescence, very close to *M. ternifolia* and are better regarded as variants of it than as separate species; cf. Francis, Austr. Rain-forest Trees 1951, 94.

4. M. tetraphylla Johns., Proc. Linn. Soc. New S. Wales 79, 1954, 15.

Australia. N. New S. Wales, S. Queensland, in lowland rain-forest or rain-forest margins. For an enumeration of localities and collectors see reference.

5. M. rousselii (Vieill.) Sleum. comb. nov. — *Roupala rousselii* Vieill., Bull. Soc. Linn. Normand. 9, 1865, 394; Guillaum., Bull. Soc. Bot. Fr. 82, 1935, 277; Fl. Anal. Nouv. Caléd. 1948, 103.

New Caledonia. Ad montes pr. Wagap: *Vieillard 2153* (BM, L; P, typus). Forêts situées au S de Kanala, vers 500 m: *Balansa 2293* (P). — Possibly a form of *M. vieillardii* with lobed leaves only.

6. M. vieillardii (Brongn. & Gris) Sleum. comb. nov. — *Roupala vieillardii* Brongn. & Gris, Bull. Soc. Bot. Fr. 10, 1863, 229 incl. var. *longifolia*

Brongn. & Gris, l. c.; Guillaum., Bull. Soc. Bot. Fr. 82, 1935, 277; Fl. Anal. Nouv. Caléd. 1948, 104.

NEW CALEDONIA. In montibus Poila: *Vieillard 1107* (P, typus *R. vieillardii*), *1108* (P, typus *R. vieillardii* var. *longifolia*). Loco haud ind.: *Pancher & Vieillard 421* (P).

7. **M. francii** (Guillaum.) Sleum. comb. nov. — *Roupala francii* Guillaum., Bull. Mus. Nat. Hist. Nat. II, 5, 1933, 325; Fl. Anal. Nouv. Caléd. 1948, 104.

NEW CALEDONIA. Prony: *Franc 2023* (K; P, typus). Plaine des Lacs: *Compton 362* (BM). Conqui, 800 m: *Pancher* (P). — Perhaps specifically not distinct from *M. vieillardii*.

8. **M. praealta** (F. v. M.) Bail., Queensl. Fl. 4, 1901, 1330, pl. 57, fig. 3; Compr. Cat. Queensl. Pl. 1913, 440. — *Helicia praealta* F. v. M., Fragm. 3, 1862, 37; Benth., Fl. Austr. 5, 1870, 404.

AUSTRALIA. N. New S. Wales. Clarence River: *Beckler* (BM; K, lecto-typus; P). Ballina, Richmond River: *Moore* (BM, K). Lismore: *Maiden 103* (A). S. Queensland. Moreton Bay, ad fl. Brisbane: *Hill* (K).

9. **M. heyana** (Bail.) Sleum. comb. nov. — *Helicia heyana* Bail., Queensl. Fl. 4, 1901, 1329; White, Contr. Arn. Arb. 4, 1933, 22.

AUSTRALIA. NE. Queensland. Palm Camp, Bellenden-Ker: *Bailey* (prob. BRI, typus, haud vidi). Ghurka Pocket, Boonjie, Atherton Tableland, 700 m: *Kajewski 1290* (A, B), common in the rain-forest.

Species excludenda

Macadamia verticillata (F. v. M.) F. v. M. ex Benth., Fl. Austr. 5, 1870, 407. — *Helicia verticillata* F. v. M., Fragm. 6, 1868, 191.

According to F. v. Mueller (cf. Benth. & Hook. f. Gen. Pl. 3, 1880, 178) probably identical with **Brabeium stellatifolium** L., once cultivated in the Sydney Botanical Garden. No precise locality is given by the author; type not seen.

III. THE GENUS GEVUINA MOL. IN AUSTRALIA AND NEW GUINEA.

There has been repeated discussion about the systematic position of *Grevillea bleasdalei* F. v. M. which successively figured in the genera *Adenostephanus, Roupala, Kermadecia* and *Euplassa* and has also been treated as a distinct genus *Bleasdalea* F. v. M. As I have pointed out in 1954, *Grevillea bleasdalei* "cannot belong to *Euplassa,* and must be inserted between *Kermadecia* and *Gevuina,* in case the (not yet known) fruit is indehiscent". A close comparison of the flower-characters of *Kermadecia, Gevuina, Grevillea bleasdalei* and *Euplassa papuana* has shown, that the latter two species share the manifestly recurved perianth-limb and the strictly lateral stigma with *Gevuina,* whilst in *Kermadecia* the limb is straight (or slightly recurved in *K. austro-caledonica* (Brongn. & Gris) Benth. & Hook.f. and *K. pronyensis* (Guillaum.) Guillaum.!) and the stigma is apparently terminal as far this can be observed in dried material. The pedicels are completely connate in *Grevillea bleasdalei, Euplassa papuana, Gevuina avellana* Mol. and the three species of *Kermadecia* described from Fiji, Samoa and the New Hebrides, whilst they are completely or partially free in the New Caledonian species of that genus. It seems to me, that the two first characters mentioned above bring *Grevillea bleasdalei* and

Euplassa papuana so close to *Gevuina,* that I feel obliged to treat them as one genus.

Gevuina Mol. thus becomes the fourth case of a proteaceous genus represented both in South America and Australia respectively New Guinea, besides three other genera viz *Lomatia, Oreocallis* and *Orites* of which the Australian-American distribution is known since a long time.

After what is said above, the distinction between *Gevuina* Mol. and *Kermadecia* Brongn. & Gris is based on minor characters only. The fruit of *Kermadecia* with its ± dry, leathery, sometimes hard, not differentiated pericarp seems to coincide with the fruit of *Gevuina avellana* Mol., but *Kermadecia austro-caledonica* (Brongn. & Gris) Benth. & Hook.f. has a thick, fibrous, rather soft exocarp and a thick stone-hard endocarp, and thus may prove to represent a separate genus pending a complete revision of the *Grevilleoideae.*

G. bleasdalei (F. v. M.) Sleum. comb. nov. — *Grevillea bleasdalei* F. v. M., Fragm. 5, 1865, 90. — *Bleasdalea cupanioides* F. v. M., l. c., nom. event.; Domin, Bibl. Bot. 89, 1921, 586, fig. 125 (fol.) — *Adenostephanus bleasdalei* (F. v. M.) Benth., Fl. Austr. 5, 1870, 417. — *Roupala bleasdalei* (F. v. M.) F. v. M., Proc. R. Soc. N. S. Wales 1881, 28; First Syst. Census 1882, 68; Sec. Syst. Census 1889, 116. — *Kermadecia bleasdalei* (F. v. M.) Benth. & Hook.f. ex Bailey, Syn. Queensl. Fl. 1883, 434; Cat. Pl. Queensl. 1890, 40; Queensl. Fl. 4, 1901, 1333; Compr. Catal. 1913, 452; Francis, Austr. Rain-forest Trees 1951, 379, 389, 390. — *Euplassa bleasdalei* (F. v. M.) Diels, Bot. Jahrb. 54, 1916, 200, in texto.

AUSTRALIA. NE. Queensland. In cacumine montis Mc Allister, Rockingham Bay: *Dallachy* (B, K; MEL, typus), yellow fl. July 1865. Mt Spec: *Francis* (K), rain-forest undergrowth. Bellenden-Ker, 1000 m: *Domin* l. c. 586. Eungella Range: *Francis* l. c. 390. Ravenshoe: *Francis* l. c.

G. papuana (Diels) Sleum. comb. nov. — *Euplassa papuana* Diels, Bot. Jahrb. 54, 1916, 200; Sleum., l. c. 70, 1939, 126, nota; Sleum., l. c. 76, 1954, 195. — *Bleasdalea papuana* (Diels) Domin, Bibl. Bot. 89, 1921, 586, in nota.

NEW GUINEA. N. New Guinea. Sepik Distr., Hunstein Mts, 1050 m: *Ledermann 8412* (B, typus; BM, K).

IV. A SECOND SPECIES OF HICKSBEACHIA F. v. M.

H. diversifolia (White) Sleum. comb. nov. — *Helicia diversifolia* White, Queensl. Dep. Agr. Bot. Bull. 20, 1918, 18, fig.; l. c. 21, 1919, 16; Contr. Arn. Arb. 4, 1933, 22.

During my revision of the genus *Helicia* Lour. it has become evident, that *H. diversifolia* White from NE. Queensland differs from this genus in the following points:

1. The tree is heterophyllous, a character, which I do not accept to occur in *Helicia.*

2. The two ovules are orthotropous and hang from or nearly from the top of the cell, whilst in *Helicia* they are anatropous, basal or laterally attached to the wall.

3. The ripe fruit (Malanda, leg. White I-18, B) is broadly ovoid, laterally compressed, ± 3.5 cm in length, c. 3 cm in width and c. 1.7 cm thick, exocarp rather soft, blackish, c. 5 mm, endocarp light, stone-hard, variously cleft, c. 4 mm; testa thin; seed 1, c. 1.7 by 0.6 cm. Such a thick endocarp does not occur in *Helicia*.

The species certainly does not belong to *Helicia* but fits well in *Hicksbeachia* F. v. M., an up till now monotypic genus known from NE. New S. Wales to NE. Queensland. *Hicksbeachia pinnatifolia* F. v. M. and *Helicia diversifolia* White have nearly the same type of deeply lobed or pinnate leaves with rigidly or nearly spiny toothed margins and they share the orthotropous pendent ovules and the well pronounced endocarp.

V. A REVISION OF THE GENUS HELICIA LOUR.

Helicia Lour., Fl. Cochinch. 1, 1790, 83; ed. Willd. 1793, 105; R. Br., Prot. Nov. Holl. Suppl. 1830, 32; Bl., Ann. Sc. Nat. II, 1, 1834, 214; Meisn., Gen. 1834, 333 (245); Endl., Gen. 1837, 342; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 81, t. 18; Endl., Gen. Suppl. IV, 2, 1847, 87; Meisn. in DC., Prodr. 14, 1856, 438; Miq., Fl. Ind. Bat. I, 1, 1858, 983; Ann. Mus. Bot. Lugd. Bat. I, 2, 1864, 204; Benth. & Hook. f., Gen. Pl. 3, 1880, 179; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 189; Engl. in E. P., Nat. Pfl. Fam. III, 1, 1889, 146; Gamble, J. As. Soc. Beng. 75, ii, 1914, 340; Ridl., Fl. Mal. Pen. 3, 1924, 140; Lemée, Dict. Gen. Pl. Phan. 3, 1931, 500, nec Pers., Syn. 1, 1805, 214 (= *Loranthus* L.). — *Helittophyllum* Bl., Bijdr. 1825, 652. — *Castronia* Noronha, Rel. Pl. Jav. in Verh. Bat. Genootsch. 5, 1827, 65, nom. nud., cf. Hassk., Cat. Pl. Hort. Bogor. 1844, 317, pro syn.; Miq., Fl. Ind. Bat. I, 1, 1858, 983, pro syn. — *Cyanocarpus* F. M. Bailey, Rep. Exp. Bellenden-Ker 1889, 55.

Arbores, rarius frutices. *Folia* plerumque spiralia, rarius subopposita vel 3—4-verticillata, simplicia, integra vel dentata, sessilia vel petiolata. *Flores* hermaphroditi, regulares. *Racemi* simplices, spiciformes, axillares vel e ligno vetere orti, rarissime subterminales. *Bracteae* parvulae, ovato-acuminatae usque subulatae, rarius foliaceae, subpersistentes vel caducae. *Bracteolae* minutae. *Pedicelli* solitarii vel plerumque geminati, liberi vel ± alte, rarius omnino connati. *Perianthium* rectum, rarissime levissime curvatum, tubo ± tenui basique ± dilatato, limbo recto clavato usque subgloboso, segmentis 4 per anthesin solutis et revolutis. *Stamina* 4, filamentis brevibus paullo infra limbi basin affixa vel subsessilia. Antherae oblongae, connectivo in appendiculum brevem producto. Exine pollinis ± laeve. *Glandulae hypogynae* 4, liberae vel approximatae, haud raro in cupulam cohaerentes vel connatae. *Ovarium* sessile, ovulis 2 anatropicis ascendentibus basi vel lateraliter (ad suturam ventralem interiorem) et fere semper infra medium affixis. Stylus elongatus gracilis, apice clavatus. Stigma terminale punctiforme. *Fructus* subglobosus vel ellipsoideus, indehiscens vel valde tarde longitudinaliter (secus suturam ventralem) vel ± irregulariter rumpens, sutura elevata vel impressa plerumque bene visibili, pericarpio coriaceo plerumque crasso, parte exteriore interdum ± succulento, parte interiore plerumque coriaceo ceterum haud vel vix diverso, interdum duro et lignescente, itaque endocarpium verum praebente, ut drupa formatur.

Semina 1—2 subglobosa resp. hemisphaerica, in parte superiore rugulosa. *Testa* membranacea. *Cotyledones* carnosi.

Type species: *H. cochinchinensis* Lour.

87 species in SE. Asia, Malaysia and E. Australia.

Conspectus sectionum

1. Inflorescentia perulata. Perianthium leviter curvatum, segmentis 3 inferioribus diutius cohaerentibus segmentoque superiore minus revolutis. Folia saepius 3—4-verticillata. **Sect. 1. Macadamiopsis** Sleum. — Type sp.: *H. youngiana* Moore & F. v. M.

1. Inflorescentia eperulata. Perianthium rectum, segmentis eodum tempore segregatis et aequaliter revolutis. Folia plerumque spiralia, rarius subopposita.

2. Drupa. Pericarpium in strata 2 bene distincta segregatum. Exocarpium plerumque ± carnosum, rarissime fibrosum. Endocarpium manifestum, durum, pergamentaceum vel lignescens. **Sect. 2. Cyanocarpus** (Bail.) Sleum. stat. nov. — *Cyanocarpus* Bail., Rep. Exp. Bellend.-Ker 1889, 55 pro gen. — Type sp.: *H. nortoniana* (Bail.) Bail.

2. Fructus indehiscens vel valde tarde longitudinaliter vel ± irregulariter rumpens. Pericarpium haud in strata 2 distincta segregatum, ± coriaceum vel satis durum, haud lignescens. **Sect. 3. Helicia.**

Clavis specierum

1. Inflorescentia perulata. *Sect. Macadamiopsis* 2

1. Inflorescentia eperulata 4

2. Rhachis et pedicelli dense sat molliter pilis ± patentibus hirsuti vel tomentosi. Perulae ± dense pilosae 3

2. Rhachis et pedicelli subdense pilis brevibus ± adpressis vestiti. Perulae ciliatae, in facie glabrae. — *Subtrop. NE. Queensland*
1a. H. youngiana Moore & F. v. M. var. **robusta** White

3. Bracteae c. 5 mm longae. — *NE. New S. Wales, SE. (and NE.?) Queensland*
1. H. youngiana Moore & F. v. M.

3. Bracteae 8—10 mm longae. — *Trop. NE. Queensland*
1b. H. youngiana Moore & F. v. M. var. **montana** White

4. Endocarpium manifestum, durum, lignescens. *Sect. Cyanocarpus* 5

4. Endocarpium haud manifestum. *Sect. Helicia* 13

5. Folia subtus diutius rufo-ferrugineo-pilosa 10

5. Folia ab initio glabra 6

6. Ramulorum apices glabrae. (Fructus subglobosus 2.5—3 cm diam.) — *NE. Queensland* . . . . **2. H. cribbiana** (Bail.) Bail.

6. Ramulorum apices diutius rufo-pilosae vel-tomentellae 7

7. Perianthium c. 15 mm longum. (Folia laxe reticulata, (10—)14—19 cm longa, (4—)4.5—6.5(—7) cm lata. Fructus ignotus.) — *N. Australia*
3. H. australasica F. v. M.

7. Perianthium 8—12 mm longum. (Fructus oblongus c. 1.2—1.3 cm longus, 0.7 cm diam.) 8

8 Folia laxe reticulata, (6—)8—12(—16) cm longa, (2.5—)3.5—6(—7) cm lata. — *NE. Queensland* . . . . **4. H. glabrescens** White

8. Folia imprimis subtus subtiliter denseque reticulata, 5—7.5(—10) cm longa, 2—3(—3.5) cm lata 9

9. Ovarium ± dense adpresse pilosum. — *Central & SE. Queensland, NE. New S. Wales* . . . . **5. H. glabriflora** F. v. M.

9. Ovarium omnino glabrum. — *SE. Queensland, NE. New S. Wales*
5a. H. glabriflora F. v. M. var. **conjunctiflora** (F. v. M.) Domin

10. Perianthium 14—16(—18) mm longum. — *NE. Queensland*
6. H. lamingtoniana (Bail.) White

10. Perianthium 5—7 mm longum 11

11. Folia integra (anguste oblonga vel lanceolata). — *New Ireland, New Britain*
7. H. uganensis Diels

11. Folia regulariter subargute serrata 12

12. Perianthium limbo 1 mm diam. Rhachis basi 1 mm diam. Folia supra in sicco saturate olivaceo-brunnescentia, nervis lateralibus 6—8 (rarius usque ad 10) ± curvato-ascendentibus. — *NE. Queensland* . . **8. H. nortoniana** (Bail.) Bail.

12. Perianthium limbo fere 1,5 mm diam. Rhachis basi c. 2 mm diam. Folia supra in sicco virescentia vel flavescentia, nervis lateralibus 12—20 ± rectiusculis interque sese manifeste parallelis. — *SE. Queensland, NE. New S. Wales* **9. H. ferruginea** F. v. M.

13. Ovarium manifeste pilosum usque tomentosum 14

13. Ovarium omnino glabrum 44

14. Folia (sub)integra 15

14. Folia certe apicem versus dentata vel serrata 33

15. Perianthium 5 (rarius ad 6) mm longum; flores fere sessiles. (Folia (11—) 12.5—15 cm longa, 4.5—6 cm lata.) — *New Guinea* **10. H. sellae-montis** Sleum.

15. Perianthium longit. 7 mm excedens; flores plerumque manifeste pedicellati 16

16. Perianthium (7—)8—12 mm longum 17

16. Perianthium longit. 13 mm excedens 28

17. Nervi laterales 14—17. (Folia 20—45 cm longa, (10—)14—20 cm lata) . . 18

17. Nervi laterales usque ad 12 19

18. Folia basin versus latissime attenuata, basi ipsa obtusa vel plerumque ± rotundata. Perianthium 9 mm longum. — *New Guinea* **11. H. amplifolia** Sleum.

18. Folia basi in petiolum cuneata, basi ipsa ± acuta. Perianthium 11(—12) mm longum. — *New Guinea* . . . . **12. H. platyphylla** Sleum.

19. Reticulatio venarum venularumque utrinque densa valdeque prominula . . 20

19. Reticulatio venarum venularumque utrinque subdensa et parum prominula, vel obscura 25

20. Ramuli annotini (plerumque florigeri) diutius tomentosi 21

20. Ramuli annotini (plerumque florigeri) citissime glabrescentes, sub anthesi glabri. Est forma foliis integris *H. excelsae*, cf. sp. 34.

21. Perianthium 7—8(—9) mm longum. Fructus 1—1.5(—1.8) cm longus, (0.6—) 0.8—1.5 cm diam., pericarpio ± 0.6 mm crasso 22

21. Perianthium (10—)11—12 mm longum. Fructus (1.8—)2—3 cm longus, c. 2 cm diam., pericarpio c. 2 mm crasso 23

22. Folia obovata vel oblongo-obovata, rarius oblonga, apice ± late attenuata, apice ipso subrotundato-obtusa, rarius obtuse acuminata, manifeste petiolata. — *Philippines* . . . . **13. H. loranthoides** Presl

22. Folia oblongo-lanceolata, apicem versus sensim acuminata, apice ipso subacuta, subsessilia. — *N. Celebes* . . . . **14. H. celebica** Sleum.

23. Pedicelli 1—2 (infimi raro usque ad 3) mm longi. Fructus ovoideus vel ovoideo-ellipsoideus 24

23. Pedicelli 3—5 mm longi. Fructus subglobosus (glaber nitidus, minute verrucosus, ± 2 cm diam.). — *Philippines* . . . . **15. H. rigidiflora** Sleum.

24. Fructus ovoideo-ellipsoideus, diutius rufo-tomentosus, 2.5—3 cm longus, c. 2 cm diam. — *Borneo* . . . . **16. H. fuscotomentosa** Suesseng.

24. Fructus ovoideus, glaber, 3.5—5 cm longus, 2.5—3 cm diam. Est forma foliis integris *H. obovatifoliae*, cf. sp. 28.

25. Folia subtus in facie diutius pilis ± crispulis tomentosa. — *Malay Peninsula* **17. H. rufescens** Prain

25. Folia subtus in facie adpresse-pilosula, vel glabra 26

26. Racemi pedunculo 4—5 cm longo incluso (17—)22—27 cm longi. — *New Guinea* **18. H. longespicata** Sleum.

26. Racemi pedunculo 1—1.5 cm longo incluso 5—15 cm longi 27

27. Ovarium obovoideo-subglobosum, laxe pilosum. Fructus usque ad 1.5 cm longus et 1—1.2 cm diam. — *SE. Celebes* . . . . **19. H. kjellbergii** Sleum.

27. Ovarium oblongo-ovoideum, dense pilosum. Fructus (2.5—)3—4(—5) cm longus, 1.5—2(—2.5) cm crassus. Est forma foliis integris *H. serratae*, cf. sp. 33.

28. Perianthii limbus sensim clavatus 5—6 mm longus. — *New Guinea* **20. H. carrii** Sleum.

28. Perianthii limbus ± abrupte ellipsoideus 2—3 mm longus 29

29. Pedicelli 5—8 mm longi. — *New Guinea* . . . **21. H. purpurascens** Sleum.

29. Pedicelli 1—2(—3) mm longi 30
30. Folia ± chartacea, 2—3.5 (raro usque ad 4) cm lata, nervis lateralibus in sicco supra haud impressis 31
30. Folia subcoriacea usque coriacea, quam 4 cm latiora, nervis lateralibus in sicco supra plerumque valde manifeste impressis 32
31. Perianthium 13—15 mm longum. — *New Guinea* . **22. H. torricellensis** Lauterb.
31. Perianthium c. 25 mm longum. — *New Guinea* . . **23. H. schlechteri** Lauterb.
32. Folia subsessilia, petiolo perbrevi 2.5—4 mm crasso. Inflorescentiae valde laxae. — *New Guinea* . . . . **24. H. lauterbachiana** Sleum.
32. Folia 1.5—2.5 cm longe petiolata, petiolo 1.5—2 mm crasso. Inflorescentiae satis densae. — *New Guinea* . . . . **25. H. oreadum** Diels
33. Nervi laterales supra valde manifeste insculpti. — *New Guinea* **26. H. stelechantha** Diels
33. Nervi laterales supra levissime vel haud impressi 34
34. Folia subtus ± dense et diutius in facie vel certe ad costam nervosque pilis patentibus vel crispulis induta, vel tarde glabrescentia 35
34. Folia subtus initio ± laxe pilis adpressis plerumque minutis induta, citissime glabrescentia, vel ab initio glabra 37
35. Perianthium 10—12 (rarius usque ad 14) mm longum 36
35. Perianthium 16—18 (interdum usque ad 20) mm longum. Folia oblanceolata usque subobovato-oblonga, apice breviter, basin versus longius attenuata. — *Yunnan, NE. Siam* . . . . **27. H. vestita** W. W. Smith
36. Folia (late) obovata vel elliptico-obovata, apice late obtuse attenuata vel plerumque rotundata, basin versus breviter attenuata. — *Annam, Kwangtung, Hainan* . . . . **28. H. obovatifolia** Merr. & Chun
36. Folia late oblanceolata vel oblongo-obovata, apicem versus gradatim ± late attenuata, basin versus ± cuneata. — *Indochina, Kwangsi* **28a. H. obovatifolia** Merr. & Chun var. **mixta** (Li) Sleum.
37. Folia maxima usque ad 2.5 cm lata. — *New Guinea* . **29. H. microneura** White
37. Folia maxima latiora 38
38. Rhachis sub anthesi gracilis ± 0.5 mm diam. 39
38. Rhachis sub anthesi robustior 1—1.5 mm diam. 41
39. Folia ± abrupte subcaudato-acuminata, haud raro subfalcata, subacuta . . 40
39. Folia breviter obtuse acuminata. — *New Guinea* . . **30. H. dentellata** Sleum.
40. Folia in sicco pallida, viridescenti-olivacea, ± irregulariter pauciserrata, supra dense reticulata; petiolus 1—2 cm longus. — *New Guinea* **31. H. ledermannii** Diels
40. Folia in sicco atroviridia vel nigrescenti-brunnea, ± regulariter serrata, supra laxius reticulata; petiolus c. 0.5 cm longus. — *New Guinea* **32. H. arguta** Sleum.
41. Folia utrinque parum vel obscure reticulata, in sicco ± olivacea usque brunnea, parum vel haud nitentia 42
41. Folia utrinque dense prominenter reticulata, in sicco virescenti-flavescentia, nitidula 43
42. Folia subcoriacea, oblonga vel elliptico-oblonga, rarius lanceolato-oblonga, plerumque manifeste serrata rarius subintegra. — *Malay Peninsula, Sumatra, Java, Borneo, Amboina* . . . . **33. H. serrata** (R.Br.) Bl.
42. Folia coriacea, ovato-elliptica usque elliptica, plerumque quam in typo minus manifeste serrata usque integra. — *Sumatra, Java* **33a. H. serrata** (R.Br.) Bl. var. **oreophila** Sleum.
43. Folia (late) obovata. Est forma glabrescens *H. obovatifoliae*, cf. sp. 28.
43. Folia ± anguste oblonga vel oblanceolata rarius obovato-oblonga. — *E. Bengal, Assam, Lower Burma, Andamans, Nicobars, Indochina, Siam, Malay Peninsula, Sumatra, Java, Borneo* . . . . **34. H. excelsa** (Roxb.) Bl.
44. Folia peltata. — *New Guinea* . . . . **35. H. peltata** White
44. Folia haud peltata 45
45. Folia usque ad 3 cm longa et usque ad 1.6 cm lata 46
45. Folia maiora 47
46. Glandulae hypogynae glabrae. Perianthium basi excepta glabrum. — *New Guinea* **36. H. cameronii** F. v. M.

46. Glandulae hypogynae manifeste longeque piloso-ciliatae. Perianthium ferrugineo-tomentosum. — *New Guinea* . . . . 37. **H. microphylla** Diels
47. Ramuli petiolis decurrentibus manifeste alati. — *Cambodge* 38. **H. elephanti** Sleum.
47. Ramuli haud alati 48
48. Pedicelli in utroque latere distincte membranaceo-alati. — *Borneo* 39. **H. pterygota** Sleum.
48. Pedicelli haud alati 49
49. Bracteae manifeste foliosae, ± obtusae, virides. — *Yunnan* 40. **H. shweliensis** W. W. Smith
49. Bracteae haud foliosae, ± acutae, haud vel vix virides 50
50. Perianthium pilis densissimis rufo-ferrugineis ± patentibus tomentosum . . 51
50. Perianthium pilis subpatentibus, crispulis vel adpressis laxe usque subdense obtectum, vel glabrum 52
51. Folia 4—6.55 cm longa, 2—3 cm lata, integra. — *New Guinea* 41. **H. microcarpa** Sleum.
51. Folia (16—)20—30(—35) cm longa, (5—)6—10(—12) cm lata, argute serrata. — *Yunnan, Tonkin* . . . . 42. **H. grandis** Hemsl.
52. Folia sessilia vel subsessilia (brevissime petiolata vel plerumque usque ad petioli basin decurrentia) 53
52. Folia manifeste petiolata (haud vel in superiore petioli parte tantum ± decurrentia 86
53. Perianthium 5—12 (raro usque ad 13) mm longum 54
53. Perianthum longitudine 13 mm excedens 69
54. Nervi laterales (certe superiores) manifeste in ²/₃ parte inferiore rectiusculi, ante marginem demum curvati 55
54. Nervi laterales omnes a costa leviter vel arcte curvato-abeuntes 61
55. Folia crasse coriacea, rigida, basi rotundata vel plerumque cordato-auriculata. — *Borneo* . . . . 43. **H. maxwelliana** Gibbs
55. Folia chartacea usque firmule subcoriacea, basi cuneato-attenuata varius subrotundata 56
56. Perianthium 5(—6) mm longum. Nervi laterales 8—10(—12). — *New Guinea* 44. **H. olivacea** Sleum.
56. Perianthium 9—12 (raro usque ad 13) mm longum 57
57. Nervi laterales 16—20. — *New Guinea* . . . . . 45. **H. commutata** Sleum.
57. Nervi laterales usque ad 12 58
58. Folia maiora, (8—)10—15(—19) cm longa, (3.5—)4—7(—10) cm lata . . 59
58. Folia minora, 4—8 cm longa, 2—3.5 cm lata 60
59. Pedicelli 3—4 mm longi . . . . cf. 49. **H. saruwagedica**
59. Pedicelli (6—)7 mm longi . . . . cf. 53. **H. peekelii**
60. Rhachis teretiuscula. Perianthii limbus abrupte ellipsoideus, 2 mm longus. — *New Guinea* . . . . 46. **H. odorata** Diels
60. Rhachis distincte angulata. Perianthii limbus sensim clavatus, 3 mm longus. — *S. Celebes* . . . . 47. **H. teysmanniana** Sleum.
61. Pedicelli 2—4 (rarius usque ad 5) mm longi 62
61. Pedicelli (6—)7 mm longi 68
62. Folia lanceolata vel oblongo-lanceolata, usque ad 2.8 cm lata. — *New Guinea* 48. **H. acutifolia** Sleum.
62. Folia forma varia, latiora 63
63. Perianthium 7—8(—9) mm longum. Fructus ± ovoideo-ellipsoideus . . . 64
63. Perianthium 10—12(—13) mm longum. Fructus oblique anguste ellipsoideus, apice rostrato-attenuatus. — *New Guinea* . . . 49. **H. saruwagedica** Sleum.
64. Folia glabra, nervis lateralibus 6—10(—12) 65
64. Folia subtus distincte adpresse rufo-pilosa, nervis lateralibus 18—20 (Fructus ignotus.) — *New Guinea* . . . . 50. **H. saurauioides** Sleum.
65. Fructus maturus 2.5—3(—5) cm longus, 1.5—2.5 cm diam. 66
65. Fructus maturus 1.5 cm longus, 1—1.2 cm diam. — *Central Celebes* 19a. **H. kjellbergii** Sleum. var. **calva** Sleum.
66. Folia 5—8 cm longa, 4—6 cm lata (coriacea, elliptica vel ovato-elliptica). — *Sumatra, Java* . . . . 33a. **H. serrata** (R.Br.) Bl. var. **oreophila** Sleum.

66. Folia (9—)12—23 cm longa, 5—8 (—11) cm lata 67

67. Folia late elliptico-oblonga, coriacea, semper integra, nervis lateralibus 6—7. (Fructus maturus haud cognitus.) — *New Guinea, New Britain* **51. H. latifolia** White

67. Folia oblonga vel elliptico-oblonga, interdum lanceolato-oblonga, rarius obovata, subcoriacea, serrata usque (sub-)integra, nervis lateralibus 8—10(—12). — *Moluccas* . . . . **52. H. moluccana** (R.Br.) Bl.

68. Nervi laterales 6—7. — *New Ireland* . . . . . . **53. H. peekelii** Lauterb.

68. Nervi laterales c. 14. — *New Ireland* . . . . **54. H. neglecta** Diels

69. Nervi laterales (certe superiores) in $^2/_3$ parte inferiore manifeste rectiusculi, ante marginem demum curvati 70

69. Nervi laterales omnes a costa curvato-abeuntes 74

70. Nervi laterales (c. 7) a costa angulo acuto alteque ascendentes. — *New Guinea* **55. H. macrostachya** Lauterb.

70. Nervi laterales a costa angulo subrecto abeuntes 71

71. Nervi laterales 7—8(—9). Reticulatio in foliis adultis supra ± conspicue immersa 72

71. Nervi laterales 10—11. Reticulatio nunquam immersa 73

72. Pedicelli haud vel basi infima tantum connati. — *Ceylon* **56. H. ceylanica** Gardn.

72. Pedicelli $^1/_3$ usque $^1/_2$ longit. connati. — *New Guinea* **57. H. retevenia** Sleum.

73. Folia integra, obovata. — *New Guinea* . . . . **58. H. obtusata** Sleum.

73. Folia denticulata, elliptica vel oblongo-elliptica. — *New Guinea* **59. H. archboldiana** Sleum.

74. Nervi laterales in sicco supra valde manifeste impressi. — *New Guinea* **60. H. wollastonii** Ridl.

74. Nervi laterales in sicco supra plani vel prominuli 75

75. Rhachis (sicut ramuli recentissimi) pilis rufis ± crispulis et subpatentibus tomentosula 76

75. Rhachis laxe vel laxissime adpresse rufescenti-pilosa, vel glabra . . . 77

76. Folia obovato-oblonga rarius (late) oblonga, basi breviter cuneata. — *Tonkin, Hainan, Kwangtung, Formosa* . . . . **61. H. formosana** Hemsl.

76. Folia oblanceolata, basin versus ± longe cuneata. — *Siam, Laos, Hainan* **61a. H. formosana** Hemsl. var. **oblanceolata** Sleum.

77. Perianthium 14—15 mm longum. — *New Guinea* . . . **62. H. affinis** Sleum.

77. Perianthium longitudine 16 mm excedens 78

78. Perianthii limbus sensim clavatus, 6—7 mm longus 79

78. Perianthii limbus ± abrupte ellipsoideus vel subglobosus, ± 3 mm longus . 80

79. Folia obovata, basi ipsa valde obtusata vel truncata. — *New Guinea* **63. H. clemensiae** Sleum.

79. Folia lanceolata vel lanceolato-oblonga, haud raro oblanceolata, basi ipsa subacuta. — *New Guinea* . . . . **64. H. forbesiana** F. v. M.

80. Folia subtus initio passim adpresse rufescenti-pilosula, demum glabrescentia. (Fructus subglobosus, haud vel vix apiculatus.) 81

80. Folia ab initio glabra. (Fructus plerumque apice basique attenuatus, apice certe apiculatus) 82

81. Folia (uncinato-)serrata. — *W. Ghats, E. Bengal, Burma, Indochina, Siam, Malay Peninsula, Sumatra, Java, Borneo, Philippines* **65. H. robusta** (Roxb.) R. Br. ex Wall.

81. Folia integra. — *Philippines; ?Borneo* . . **65a. H. robusta** (Roxb.) R. Br. ex Wall. var. **integrifolia** (Elm.) Sleum.

82. Folia oblanceolata, rarius oblongo-obovata, ± grosse (uncinato-)serrata. (Fructus laevis.) — *Indochina, Hainan, Kwangsi, Kwangtung* **66. H. hainanensis** Hayata

82. Folia ± late obovato-oblonga vel obovato-elliptica, vel obovata, plerumque leviter serrata usque denticulata, rarius integra 83

83. Flores subsessiles, pedicellis 1—1.5 mm longis. — *Tonkin* **67. H. grandifolia** Lec.

83. Flores manifeste (certe 3 mm longe) pedicellati 84

84. Perianthium 16—17 mm longum. — *New Guinea* . **68. H. finis-terrae** Lauterb.

84. Perianthium (20—)25—28 mm longum 85

85. Folia firmule chartacea usque subcoriacea, in sicco virescentia, olivaceo-flavescentia vel dilute brunnea. Fructus ± manifeste obtuse longitudinaliter 6-costatus. — *Siam, Sumatra, Malay Peninsula, Java, Bali, Borneo* **69. H. attenuata** (Jack) Bl.

85. Folia rigide subcoriacea vel coriacea, in sicco brunneo-nigrescentia. Fructus haud costatus. — *S. Lower Burma, S. Siam, Malay Peninsula, Borneo* **77a. H. petiolaris** Benn. var. **kingiana** (Prain) Sleum.

86. Venae supra in sicco manifeste impressae 87

86. Venae supra in sicco haud vel levissime impressae, plerumque prominulae . 88

87. Perianthium c. 16 mm longum. — *New Guinea* . . . **70. H. bullata** Sleum.

87. Perianthium c. 30 mm longum. — *New Guinea* . . **71. H. insculpta** Sleum.

88. Nervi laterales omnes a costa curvato-abeuntes 89

88. Nervi laterales (certe superiores) in $^2/_3$ parte inferiore bene rectiusculi, ante marginem demum curvati 98

89. Folio oblanceolata vel oblongo-obovata, basin versus ± longe cuneata . . 100

89. Folia (lanceolato-) oblonga vel elliptica vel (oblongo-) obovata, basi ± breviter cuneata 92

90. Perianthium 11—12 mm longum. — *Yunnan* . . **72. H. silvicola** W. W. Smith

90. Perianthium quam 16 mm longius 91

91. Perianthium 18—23 mm longum. — *Lower Burma, Yunnan* **73. H. pyrrhobotrya** Kurz

91. Perianthium 30—35 mm longum. — *Tonkin* . . . . **74. H. petelotii Merr.**

92. Perianthium laxe usque dense ± longe adpresse rufo-vel ferrugineo-pilosum . 93

92. Perianthium parcissime brevissimeque adpresse pilosulum vel glabrum . . 94

93. Folia in sicco pallide olivaceo-viridia vel flavescentia. Perianthium 17—18 (—20) mm longum. *New Guinea* . . . . **75. H. hypoglauca** Diels

93. Folia in sicco saturate (olivaceo-) castanea. Perianthium 25 mm longum. — *New Guinea* . . . . **76. H. albiflora** Sleum.

94. Rhachis robusta, ± 2.5 mm diam. 95

94. Rhachis gracilior, 1—1.5 (raro usque ad 2) mm diam. 96

95. Rhachis sicut ramuli novelli glabra vel subglabra (parcissime minuteque pilosula). — *Malay Peninsula, Borneo* . . . . . . **77. H. petiolaris** Benn.

95. Rhachis sicut ramuli novelli ± dense ferrugineo-tomentosula. — *Yunnan* **78. H. clivicola** W. W. Smith

96. Reticulatio sat densa, supra bene prominula 97

96. Reticulatio laxa supra haud vel parum prominula. — *S. India, Sikkim, Bhutan, E. Bengal, Assam, Manipur, Burma, Yunnan, Indochina, Siam* **79. H. nilagirica** Bedd.

97. Folia in sicco saturate brunnea vel nigrescentia, nervis lateralibus 4—5. — *Mindanao* . . . . **80. H. paucinervia** Merr.

97. Folia in sicco pallide olivaceo-virescentia, nervis lateralibus 7—8. — *New Guinea* **81. H. pallescens** Diels

98. Perianthium sat dense adpresse rufescenti-pilosum 99

98. Perianthium glabrum vel subglabrum 101

99. Inflorescentia valde laxa. Perianthium gracillimum, tubo 0.4 mm diam. Rhachis 0.5—0.7 mm diam. — *Mindanao* . . . . **82. H. graciliflora** Merr.

99. Inflorescentia sat densa. Rhachis 1.5—2.5 mm diam. Perianthii tubus 0.8—1 mm diam. 100

100. Petiolus 0.5—1 cm longus. Folia elliptico-oblonga vel elliptica. — *New Guinea* **83. H. biformis** Sleum.

100. Petiolus 1.5—2.5(—3) cm longus. Folia oblonga vel lanceolato-oblonga. — *New Guinea* . . . . **75. H. hypoglauca** Diels

101. Perianthium 30—35 mm longum. Costa supra ± impressa. — *Tonkin* **84. H. cauliflora** Merr.

101. Perianthium usque ad 23 mm longum. Costa supra elevata 102

102. Petiolus 2—3(—5) cm longus. Folia integerrima, nervis infimis utroque latere singulis e basi laminae orientibus, ceteris superioribus a costa abeuntibus. (Perianthium 15—16 mm longum.) — *Hainan* . . **85. H. longepetiolata** Merr.

102. Petiolus 0.5—1.5 cm longus. Folia plerumque, imprimis antice, serrata, nervis lateralibus omnibus a costa abeuntibus 103

103. Folia (anguste) lanceolata, 1—2.5(—3) cm lata. Perianthium 20—23 mm longum. — *Annam* . . . . **86. H. stenophylla** Merr.

103. Folia oblonga vel elliptica vel obovato-oblonga, plerumque latiora. Perianthium usque ad 17 mm longum 104

104. Venae venulaeque supra subtusque valde prominulae, interdum (in foliis bene maturis) supra leviter immersae. Folia late oblonga vel late obovato-elliptica. Perianthium 14—17(—18) mm longum. — *Kweichow, Kwangsi, Kwangtung*
87a. H. cochinchinensis Lour.
var. **pseuderratica** Sleum.

104. Venae venulaeque supra subtusque parum vel plerumque haud prominulae . 105

105. Folia (lanceolato-)oblonga vel oblanceolata, rarius subobovato-oblonga (5—) 6—13 (raro usque ad 14) cm longa, 2—3(—4, raro usque ad 5) cm lata. — *Indochina, S. & SE. China, Formosa, Riu-Kiu, S. Japan*
87. H. cochinchinensis Lour.

105. Folia 13—22 cm longa, (6—)7—12 cm lata. — *Kwangtung, Kiangsi*
87b. H. cochinchinensis Lour. var. **lungtauensis** Sleum.

1. H. youngiana Moore & F. v. M. in F. v. M., Fragm. 4, 1864, 84; Bail., Fl. Queensl. 4, 1901, 1327; White, Contr. Arn. Arb. 4, 1933, 23. — *Macadamia youngiana* (Moore & F. v. M.) F. v. M. in Benth., Fl. Austr. 5, 1870, 406; Bail., Queensl. Dep. Agr. Bull. 18 (Bot. Bull. 5, 1892) 51.

var. **youngiana** — *H. youngiana* Moore & F. v. M. var. *typica* White, Contr. Arn. Arb. 4, 1933, 23.

Frutex 2.5—3.5 m, cortice saturate cinereo lenticellis albidis numerosis pustulato, ramulis gracilibus teretibus, novellis dense breviter fusco-ferrugineo-tomentosis, ceterum glabris et in sicco nigrescentibus. *Folia* ternato-, rarius quaternato-verticillata, elliptico-oblonga usque oblongo-lanceolata, apice ± longe acuminata glandulaque terminali submucronata, basi ± late attenuata, subcoriacea, in vivo laete viridia, in sicco saturate olivaceo-brunnescentia, subtus pallidiora, supra nitida et costa excepta glabra, subtus ad costam et nervos dense, per faciem laxe pilis rufescentibus sericeis induta, integra vel plerumque apicem versus ± profunde pauciserrata, (5—)6—12 (—14, rarius usque ad 17) cm longa, 2—3(—4) cm lata, costa supra leviter impressa, subtus prominente, nervis lateralibus utroque latere 8—10, supra planis vel impressis, subtus parum prominentibus, margine curvato-conjunctis, uno alteriore in dentem protractis, venis venulisque utrinque dense reticulato-prominulis; petiolus dense fusco-tomentosus vix 3—5 mm longus. *Racemi* terminales perulati, breviter pedunculati, 3—5(—7, rarius usque ad 10) cm longi, omnino dense tomento hirsutulo fusco-ferrugineo obtecti, perulis ovatis subacuminatis decrescentibus pluribus ± dense pilosis, pro parte cito caducis, pro parte diutius persistentibus, 2—4 mm longis. *Bracteae* perulis simillimae diu persistentes, dense ciliolatae, dorso parum pilosulae, usque ad 5 mm longae et latae. *Pedicelli* graciles 3—5(—7) mm longi. *Perianthium* in vivo albidum vel rosaceum, suaveolens, cylindricum, leviter curvatum, (14—)16—18 mm longum, apice quam in tubo densius hirsutulum, segmentis 3 inferioribus segmento superiore diutius cohaerentibus et minus revolutis. *Antherae* 1 mm longae. *Glandulae hypogynae* oblongae, omnino liberae, distantes. *Ovarium* fusco-ferrugineo-hirsutulum, apice in stylum gracilem inferne patenti-pilosum apice glabrum sub anthesi incipiente curvatum et per perianthium unilateraliter scissum penetrantem, demum rectum abiens, ovulis 2 anatropicis in superiore cavitatis parte manifeste lateralibus superpositis. *Fructus* (drupaceus ?) globosus usque ovoideus, apice basique ± attenuatus, 2.5—4 cm longus et 2—3.5 cm diam., indehiscens, laxe pubescens, in vivo ruber, in sicco rugosus, sutura prominente. Pericarpium extus subcarnosum, intus pergamentaceum. Semen unicum globosum.

Australia. NE. New S. Wales. Duck Creek, Richmond River: *Moore 4* (K; MEL, *typus*). Richmond River: *Henderson, Fawcett.* Lismore: *Rothwell,* cit. White. Alstonville: *Tomlinson,* cit. White. Mt. Warning: *Forsyth,* cit. White. Dorrigo: *Boorman, Maiden*; *White 7490,* cit. White; ibid., Dorrigo Brush For. Res., Head of Bellinger River: *Duff 7.* Bellinger River: *Slater,* cit. White. Murwillumbah: *Bauerlen.* Tweed River: *Forsyth.* Upper Eungella, Tweed River: *White 3278.* SE. Queensland. Lamington National Park: *Shirley.* Macpherson Range: *White.* Upper Tallebudgera: *White,* cit. White. Springbrook: *White,* cit. White. Nerang Creek: *Schneider,* cit. White. NE. Queensland, "Rockingham Bay": *F. v. Mueller* (K).

1a. var. **robusta** White, Contr. Arn. Arb. 4, 1933, 23.

Rhachis et pedicelli subdense pilis brevibus ± adpressis induti. Perulae ciliatae, in facie glabrae. Folia usque ad 20 cm longa et 5.5 cm lata.

Australia. NE. Queensland. Maroochy: *Bailey, Low,* cit. White. Yandina, Eumundi: *Bailey, Simmonds.* East Malanda, Atherton Tableland, 700 m: *Kajewski 1219* (A, B, K, NY; NSW, lecto-*typus*, haud vidi; S). Cook Distr., E. of Ravenshoe, c. 1000 m: *Blake 9891.*

1b. var. **montana** White, Contr. Arn. Arb. 4, 1933, 24.

A typo bracteis 8—10 mm longis differt.

Australia. NE. Queensland. Bellenden-Ker, Palm Camp: *Bailey,* cit. White. Bellenden-Ker, near the summit: *White* (NSW, *typus,* haud vidi); ibid., 1585 m: *Sayer.* Mt Bartle Frere: *Johnson.*

2. **H. cribbiana** (Bail.) Bail., Queensl. Fl. 4, 1901, 1327. — *Cyanocarpus cribbiana* Bail., Queensl. Agric. J. 1, 1897, 370.

Arbor glabra c. 6 m alta. *Ramuli* glabri, striati. *Folia* oblonga vel obovato-oblonga, rarius oblanceolata, apice brevissime sat abrupte obtuse acuminata, basi late in petiolum cuneata, in superiore parte petioli decurrentia, subcoriacea, in sicco dilute flavescenti-olivacea, glabra, utrinque nitidula, integra, margine parum revoluta, 11—17 cm longa, 4—8 cm lata, costa supra impressa, subtus bene prominente, nervis lateralibus utroque latere (6—)7—8 leviter curvatis, distantibus, ± distincte anastomosantibus, supra parum impressis, subtus prominentibus, venis venulisque utrinque densissime reticulatis minuteque prominulis; petiolus (0.5—)1—1.5 cm longus. *Racemi* axillares 5—10 cm longi. *Rhachis* glabra, 1—1.5 mm diam. *Flores* desunt. *Fructus* drupaceus obovoideo-globosus, basi paullo contractus, in vivo ruber, c. 2.5—3 cm diam., exocarpio in vivo carnoso, in sicco lacunoso-rugoso, coriaceo, 2 mm crasso, endocarpio in fructu maturo bene distincto duro, lignescente, flavescente, 1—1.5 mm crasso.

Australia. NE. Queensland: Mourilyan Distr.: *Cowley* (K, *typus*), Sept. 1897. Johnstone River: *Ladbrook 51* (B), fr. mat. 8-1917. Innisfail: *Michael 243* (GH), in dense forest.

3. **H. australasica** F. v. M. in Hook., J. Bot. & Kew Gard. Misc. 9, 1857, 22; Meisn. in DC., Prodr. 14, 1857, 699; Benth., Fl. Austr. 5, 1870, 405; Ewart & Davies, Fl. North Terr. 1917, 87.

Arbor parva gracilis 5—10 m alta, ramulis teretibus sat gracilibus, apicibus breviter rufo-tomentellis, ceterum glabris griseo-corticatis. *Folia* oblongo-elliptica usque subovato-oblonga, apice breviter acuminata, subacuta vel obtusa, basi in petiolum attenuata rarius longius cuneata, subcoriacea, glabra, in sicco olivacea vel brunnescentia paulloque nitida, subtus pallidiora, margine irregulariter sat grosse crenato-subserrata (dentibus nervis lateralibus protractis terminatis) vel passim integra, (10—)14—19 cm longa, (4—)4.5—6.5(—7) cm lata, costa subtus prominente, nervis lateralibus utroque latere c. 8—9 inter sese parum distincte arcuato-conjunctis, subtus prominentibus, venis venulisque sat laxe reticulatis et prominulis; petiolus 0.5—1 cm longus, in foliis junioribus sicut costa ferrugineo-pilosus, cito glabrescens. *Racemi* graciles, ± penduli, sat laxiflori, (7—)9—17 cm longi. *Rhachis* 1 mm diam., laxe pilis rufo-ferrugineis adspersa. *Bracteae* ovato-acutae, minutae, vix 1 mm longae. *Pedicelli* plerumque geminati, liberi vel alte connati, 1—2 mm longi, quam rhachis densius pilosi. *Perianthium* pallide flavidum, gracile, c. 15 mm longum, tubo 0.5 mm diam., limbo 1.2 mm diam., basi et apice laxissime pilis rufescentibus adspersum ceterum glabrum. *Antherae* 1.5 mm longae. *Glandulae hypogynae* liberae, late truncatae, crenulatae, approximatae, ut cupula formata esse videtur. *Ovarium* dense rufo-pilosum, pilis sericeis elongatis erectis obtectum, stylo gracillimo glabro. *Fructus* ignotus, probabiliter drupaceus.

AUSTRALIA. N. Australia. Towards Macadam Range, ad rivulorum ripas: *F. v. Mueller* (K, *typus*). Arnhem Land, Port Darwin: *Tennison-Woods & Holtze 233*, *Schultz 559* (B, K); 14 miles E Port Darwin, bank of fresh water hole: *Bleeser 860* (B); ibid., Rapid Creek: *Juany.*

4. H. glabrescens White, Proc. R. Soc. Queensl. 55, 1944, 81. — *H. australasica* (non F. v. M.) Bail., Queensl. Fl. 4, 1901, 1328.

Arbor parva, ramulis apicibus tantum ferrugineo-tomentellis ceterum glabris, in partibus vetustioribus teretibus cinerascentibus. *Folia* lanceolata vel oblongo-lanceolata, apice acuminata, subacuta vel obtusa, basi gradatim in petiolum angustata, subcoriacea, in sicco flavescenti-viridia, costa subtus laxissime pilosa excepta glabra, imprimis supra nitentia, sat regulariter serrato-dentata (dentibus glandula terminatis obtusiusculis parum protractis ± 1 mm altis) vel raro subintegra, (6—)8—12(—16) cm longa, (2.5—)3.5—6(—7) cm lata, costa supra parum, subtus distincte prominente, nervis lateralibus utroque latere c. 8 subrectis, praeter marginem inter sese curvato-conjunctis, utrinque, imprimis subtus prominulis, venis utrinque laxe reticulato-prominulis; petiolus vix 2—3 mm longus. *Racemi* graciles 7—12 cm longi. *Rhachis* sicut pedicelli glabra vel laxe usque laxissime pilis fuscis induta, c. 1 mm diam. *Bracteae* ovato-lanceolatae, vix 1 mm longae, subpersistentes. *Pedicelli* 2—3 mm longi, solitarii vel bini, usque ad medium connati. *Perianthium* 10—12 mm longum, glabrum, tubo c. 0.5 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* late oblongae usque subquadratae, liberae, approximatae, 1 mm altae. *Ovarium* dense rufo-subsericeo-pilosum, stylo gracillimo glabro. *Fructus* ellipsoideus, 1.3 cm longus, 0.7 cm diam., probabiliter drupaceus.

AUSTRALIA. NE. Queensland. Cook Distr., Barron River: *Cowley 74 B* (BRI, *typus*, haud vidi); near Cairns: *Blake 12415*, cit. White; ibid., Freshwater Creek: *Bailey*, cit. White; Mt Surgeon: *White 10643*, cit. White; Julatten: *Carr*, cit. White; Malanda: *Martin*, cit. White; Atherton Tableland: *Martin 26*, cit. White; Big Tableland: *Flecker*, *N. Queensl. Herb. Cairns 14253.*

5. H. glabriflora F. v. M., Fragm. 2, 1860, 91; l.c. 3, 1862, 38; l. c. 5, 1866, 186; First Census 1889, 116; Benth., Fl. Austr. 5, 1870, 405; Bail., Syn. Queensl. Fl. 1883, 433; Catal. Pl. Queensl. 1890, 40; Moore, Handb. Fl. N. S. Wales 1893, 235; Bail., Queensl. Fl. 4, 1901, 1328; Compr.

Catal. 1913, 452; Domin, Bibl. Bot. 89, 1921, 30; Francis, Austr. Rain-Forest Trees 1951, 87. — *H. subrhombifolia* Domin, Bibl. Bot. 89, 1921, 31.

Arbor parva usque ad 10 m alta, interdum fruticiformis, cortice cinereo laeviusculo, ramulis apicibus laxe ferrugineo-pilosis, ceterum citissime glabrescentibus. *Folia* oblongo-lanceolata usque rhombeo-elliptica, apice breviter ± obtuse acuminata, basi in petiolum brevissimum (2—3 mm) attenuata et ± decurrentia, subcoriacea usque coriacea, in vivo dilute viridia, in sicco olivacea vel flavido-virescentia, subtus pallidiora, subnitida vel opaca, glaberrima, integra vel rarius hic inde apicem versus dente brevi instructa, 5—7.5(—10) cm longa, 2—3(—3.5) cm lata, costa subtus prominente, nervis lateralibus utroque latere c. 10—12 angulo fere recto a costa abeuntibus, in inferiore parte ± rectis, marginem versus curvatis et inter sese conjunctis, supra vix, subtus parum prominulis, aliis minus distinctis intercalaribus, venis venulisque imprimis subtus dense reticulatis, minute sed bene visibiliter elevatis. *Racemi* axillares pedunculo 2—3 cm longo incluso c. 7—9 cm longi, multiflori. *Rhachis* gracilis, in sicco viridescens, glabra. *Bracteae* ovato-lanceolatae, vix 1 mm longae, cito caducae. *Pedicelli* 2—3 mm longi, saepius gemini et usque ad medium connati, laxe pilis dilute rufescentibus obtecti, vel subglabri. *Perianthium* glabrum, 8—9 mm longum, tubo vix 1 mm diam., in vivo albido-flavescens. *Antherae* fere 2 mm longae. *Glandulae hypogynae* brevissimae, truncatae, in vivo flavae, liberae, anthesi ± in cupulam approximatae, post anthesin saepe disjunctae. *Ovarium* tenuiter adpresse pilosum, stylo filiformi glabro. *Fructus* drupaceus oblongus, c. 1.2 cm longus, exocarpio succulento caeruleo, endocarpio cartilagineo.

AUSTRALIA. C. Queensland. Montville, Blackall Range: *Longmon*. SE. Queensland. Tambourine Mts: *Domin* (B, fragm.; PRC, *typus H. subrhombifol.*, haud vidi). Yandina: *Shirley*. Kin-Kin: *White*. NE. New S. Wales. Leycester Creek, affl. Richmond River: *Beckler* (MEL, *typus H. glabriflor.*). Richmond River: *Carron* (FI). Camden Haven, near Port Macquarie: *Moore*.

5a. var. **conjunctiflora** (F. v. M.) Domin, Bibl. Bot. 89, 1921, 30, in texto. — *Helicia conjunctiflora* F. v. M., Fragm. 5, 1865, 38.

Ovario omnino glabro a typo recedit.

AUSTRALIA. SE. Queensland. Beechmont, 600 m: *White*. Eumundi, S from Gympie: *Bailey & Simmonds*. NE. New S. Wales: Richmond River: *Moore* (MEL, *typus*). Mullumbimby: *Baker*.

6. H. lamingtoniana (Bail.) White ex L. S. Smith, Proc. R. Soc. Queensl. 62, 1952, 79. — *Hollandaea lamingtoniana* Bail., Queensl. Agric. J. 5, 1899, 390; Queensl. Fl. 4, 1901, 1354.

Arbor parva vel mediocris, ramulis in vivo saturate ferrugineo-, in sicco rufo-tomentosis, demum glabrescentibus. *Folia* elliptica vel subrotundato-ovata, apice brevissime lateque acuminata, obtusa, interdum breviter retusa, basi late in petiolum cuneata et ± decurrentia, subcoriacea usque chartacea, supra in vivo intense viridia et lucida, in sicco flavescenti-viridia et subnitida, costa nervisque diutius rufo-tomentosulis exceptis glabra, subtus in sicco rubro-castanea atque per totam faciem imprimis ad costam et nervos saturate molliter rufo-tomentosula, interdum cito glabrescentia, sat regulariter venis super marginem prorumpentibus denticulata (denticulis prorsus versis vix 1 mm altis, glandulis terminatis itaque obtusis, 5—8 mm distantibus), rarius fere integra, (8—)10—15 cm longa, 5—7.5(—8.5) cm lata, costa supra fere plana, subtus valde prominente, nervis lateralibus utroque latere 8—9 subarcuatis et ± distincte curvato-conjunctis, supra planis vel (in speciminibus siccis!) levissime immersis, subtus bene prominentibus, venis venulisque sat dense reticulatis, supra parum conspicuis, subtus manifestius prominulis; petiolus diutius rufo-tomentosus, 1—1.5 cm longus. *Racemi* ex avxillis summis orti, erecti, sat rigidi, pedunculo brevi incluso 6—10 cm longi, ubique saturate rufo-tomentosi. *Rhachis* 1.5 mm diam. *Bracteae* ovatae, minutissimae, tomento ± occultae. *Pedicelli* rigidiusculi, plerumque gemini et usque ad medium connati, c. 4 mm longi. *Perianthium* 14—16(—18) mm longum, tubo fere 1 mm diam., limbo clavato c. 2 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* ovato-oblongae, omnino liberae, 1.2 mm altae. *Ovarium* dense rufo-subsericeo-pilosum, stylo gracili glabro. *Fructus* ignotus, probabiliter drupaceus.

AUSTRALIA. NE. Queensland. Evelyn: *Bailey* (B; BRI, *typus*, haud vidi). Mt Spurgeon: *White 10643a*, glabrescent form.

7. **H. uganensis** Diels ex Sleum., Bot. Jahrb. 70, 1939, 145.

Arbor 5—8 m, ramulis teretibus, apicibus rufo-ferrugineo-tomentosis ceterum glabratis, vetustioribus defoliatis inflorescentias gerentibus crassis griseo-corticatis. *Folia* anguste oblonga vel lanceolata, apice sensim acuminata, subacuta, basi ± longe et gradatim in petiolum angustata, subsessilia, rigide chartacea usque subcoriacea, integra, supra in sicco saturate glauco-viridia vel brunnescentia paulloque nitentia, subtus dilute brunnea et subopaca, supra costa nervisque brevissime tomentellis exceptis glabra, subtus in facie laxissime, ad costam, nervos et venas densius usque dense brevissime fusco-pilosa, (13—)16—24 cm longa, (4—)5—7 cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 10(—12) subarcuatis supra fere planis, subtus parum, sed distincte prominentibus, venis subtus laxe reticulato-prominulis; petiolus 2—3 mm diam., tomentosus, 3—6 mm longus. *Racemi* graciles, usque fere ad basin densiflori, 11—14 cm longi, ad rhachidem et pedicellos dense, ad perianthia subdense rufo-ferrugineo-tomentosi. *Rhachis* 1—1.5 mm diam. *Bracteae* ovato-lanceolatae, 1—2 mm longae. *Pedicelli* crassiusculi, plerumque bini usque ad medium connati, 1—1.5 mm longi. *Perianthium* in vivo flavescenti-brunnescens, c. 7 mm longum, tubo 0.5 mm diam., limbo 1 mm diam. *Antherae* 1 mm longae. *Glandulae hypogynae* late oblongae, liberae. *Ovarium* rufo-villosum, stylo filiformi glabro. *Fructus* drupaceus, ellipsoideus, 5—7 cm longus, 3.5 cm diam., niger. Pericarpium in fructibus immaturis coriaceum 4—5 mm crassum, in fructibus maturis in parte exteriore primo succulentum, demum stratum spongiosum quasi suberosum fibris longitudinalibus et subreticulato-anastomosantibus instructum maturitate plena ± dissolutum praebens, in parte interiore 1—1.5 mm crassa satis durum sublignescens, endocarpium praebens. Semen unicum apice rugulosum.

NEW IRELAND. Ugana: *Peekel 1209* (B, *typus*).

NEW BRITAIN. Talili Gap: *Peekel* (K), fr. juv. Oct. 1928. Galilo near Cape Hoskins, W. Nakanai: *N.G.F. 6497 Floyd* (LAE), fl., in secondary rain-forest close to the sea-shore. Kabakada, N. Coast of Gazelle Peninsula: *Waterhouse 349* (NY), fr. mat.

Very similar in leaf-characters and tomentum of the rhachis, but determination not certain as flowers are not present:

NEW GUINEA. NE. New Guinea. Morobe Distr., Wau Garden area, c. 1370 m: *McAdam 229* (LAE).

Note. I have little doubt, that the ripe fruit of the Waterhouse specimen, on which the description was based, belongs to *H. uganensis* (the type-specimen of which bears only flowers), especially as Peekel in sched. says, that the full grown fruit reaches 5—7 cm in length, what coincides with the Waterhouse plant. The differentiation of the pericarp into an outer corky-spongious soft layer and an inner one, which is a hard endocarp, brings the species into the Sect. *Cyanocarpus* as the only one outside of Australia. The Australian species of the section, however, never show such fibres joined into a kind of net, nor such a corky or spongious exocarp; this peculiar layer makes us suspect, that the fruit of *H. uganensis* may be capable to drift.

8. **H. nortoniana** (Bail.) Bail., Queensl. Fl. 4, 1901, 1328; Compr. Cat. 1913, 452, fig. 436. — *Cyanocarpus nortoniana* Bail., Rep. Gov. Sci. Exp. Bell.-Ker 1889, 55; Third Suppl. Syn. Queensl. Fl. 1890, 61; Cat. Pl. Queensl. 1890, 40. — *H. ferruginea* F. v. M. ap. Benth., Fl. Austr. 5, 1870, 405 pr. p.; Domin, Bibl. Bot. 89, 1921, 30; White, Contr. Arn. Arb. 4, 1933, 22. — *H. ferruginea* F. v. M. var. — Bail., Cat. Queensl. Woods 1886, 69. — *H. ferruginea* F. v. M. var. *tropica* Bail., Compr. Cat. 1913, 452. — *H. tropica* (Bail.) Domin, Bibl. Bot. 89, 1921, 30.

Arbor parva vel mediocris usque ad 25 m alta, cortice tenui dilute brunneo, ramulis tortuosis ± pendentibus, intense fulvo-ferrugineo-tomentosis vel fere -villosis. *Folia* ovato-elliptica vel (ovato-)oblonga, rarius ovato-lanceolata, apice breviter acuminata, ± falcata et subacuta, basi late in petiolum cuneata usque subrotundata, parum inaequilateralia, subcoriacea vel firmule chartacea, in sicco ± saturate olivaceo-brunnescentia, novella utrinque rufo-ferrugineo-tomentosula, adulta supra costa nervisque diutius tomentellis exceptis glabra, opaca vel subnitentia, subtus initio per totam faciem, imprimis ad costam et nervos rufo-ferrugineo-tomentosa, demum ± glabrescentia, argute sat dense ± irregulariter serrata (dentibus prorsus versis glandula minuta terminatis obtusiusculis 1—3 mm altis et 3—8 mm distantibus), (7—)8—12(—17, rarius usque ad 20) cm longa, 3—6(—8) cm lata, costa supra fere plana, subtus bene prominente, nervis lateralibus utroque latere 6—8(—10) ± curvato-ascendentibus, prope marginem parum conspicue inter sese venis ± transversis conjunctis, supra haud, subtus bene prominentibus, venis venulisque supra ± obscuris, subtus sat laxe reticulatis parum prominulis; petiolus dense rufo-pilosus, 0.6—1 cm longus. *Racemi* axillares et subterminales, densiflori, pedunculo 1—2 cm longo incluso 5—10 cm longi, graciles, ascendentes, ubique rufo-ferrugineo-tomentosi. *Rhachis* vix 1 mm diam. *Bracteae* ovato-acuminatae, 1 mm longae. *Pedicelli* 1.5—2 mm longi, plerumque bini et usque fere ad apicem connati. *Perianthium* in vivo albido-brunnescens vel rosaceum, 6—7 mm longum, tubo 0.5 mm diam., limbo 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* ± late ovato-oblongae, irregulares, liberae, divergentes. *Ovarium* rufo-tomentosum, stylo pergracili glabro. *Fructus* drupaceus ovoideus, 10—13 cm longus, 8—10 mm diam., in vivo laete purpureus vel azureus, ± pilosus et nitidulus, exocarpio carnoso succulento, endocarpio cartilagineo.

AUSTRALIA. NE. Queensland. Cook Distr., Tringilburra Creek and creeks of Russell River: *Bailey* (BRI, *typus H. norton. ?*, haud vidi; K, fragm.). Lower Russell River: *Diels 8486*. Harveys Creek and Lower Russell River, cit. Domin, haud vidi. S. of Cairns, 40 m: *Diels 8540*. Daintree River: *Brass 2219*. Between Endeavour River and Port Douglas: *Lucas*. Mossmann River gorge: *Brass 2105*. Gadgarrah, Atherton, 800 m: *Kajewski 1039*. Bellenden-Ker: *White 1290*; ibid., 1585 m: *Sayer 110*. Innisfail: *Michael*. Johnstone River (c. 17° 40′): *Johnson* (MEL, cit. *Bailey*, Cat. Queensl. Woods 1886, 69, *typus H. ferrug.* var. *tropica*). Rockingham Bay: *Dallachy*.

9. H. ferruginea F. v. M., Fragm. 3, 1862, 37; l.c. 4, 1864, 174; l. c. 5, 1866, 186; l. c. 6, 1868, 191, 224; First Census 1882, 68; Sec. Census 1889, 116; Benth., Fl. Austr. 5, 1870, 405 pr. p.; Bail., Syn. Queensl. Fl. 1883, 433; Cat. Queensl. Woods 1886, 55; l. c. 1888, 100; Maid., Usef. Nat. Pl. Austr. 1889, 555; Bail., Cat. Queensl. Woods 1889, 115; Cat. Pl. Queensl. 1890, 40; Moore, Fl. N. S. Wales 1893, 235; Bail., Queensl. Fl. 4, 1901, 1328; Dean, Proc. Linn. Soc. N. S. Wales 25, 1901, 587, pl. 38 bis, fig. 11; Bail., Queensl. Agric. J. 28, 1912, 199; Compr. Cat. 1913, 452. — *H. bauerlenii* White, Proc. R. Soc. Queensl. 55, 1944, 80; Francis, Rain-forest Trees Austr. 1951, 91.

Frutex vel arbor parva 6—10 m alta, trunco c. 15 cm diam., ramulis robustis, junioribus dense, novellis densissime ferrugineo-pilosis vel -tomentosis. *Folia* lanceolata vel oblongo-lanceolata, sensim apice acuminata, acuta vel apice extremo glandula minuta obtusiuscula, superiora basi cuneata, inferiora basi obtusa vel subrotundata, saepius parum inaequilateralia, rigide subcoriacea, in sicco supra flavido-viridia et nitidula, subtus brunnescenti-olivacea et ± opaca, novella supra ad costam et nervos, subtus ultro per faciem molliter pilis rufo-ferrugineis ± patentibus pilosa vel -tomentosa, adulta supra glabra vel ad costam parum pubescentia, subtus diutius per faciem, imprimis ad costam et nervos rufo-ferrugineo-pubescentia, regulariter serrata (dentibus prorsus versis ± uncinatis 1—1.5 mm altis et 6—10 mm distantibus), 9—12(—18, interdum usque ad 26) cm longa, 3—6(—7.5) cm lata, costa supra minute impressa, subtus bene prominente, nervis lateralibus utroque latere 12—20 a costa rectiuscule abeuntibus, inferne subrectis, ante marginem valde manifeste inter sese curvato-conjunctis, aliis intercalaribus pluribus minus distinctis, omnibus inter sese manifeste parallelis, supra planis vel levissime impressis, subtus prominentibus, venis venulisque dense reticulatis supra minute, subtus manifeste prominulis; petiolus 2—5(—8) mm longus, 2—2.5 mm crassus, ± persistenter rufo-tomentosus. *Racemi* axillares solitarii vel rarius bini, ubique rufo-ferrugineo-tomentosi, fere usque ad basin densiflori, 5—8 cm longi. *Rhachis* fere 2 mm crassa. *Bracteae* ovato-lanceolatae, c. 1.5 mm longae, glabrescentes. *Pedicelli* normaliter brevissimi, vix 1 mm longi, raro 2 mm aequantes, bini, fere omnino connati. *Perianthium* c. 5 mm longum, tubo c. 1 mm diam., limbo clavato 1.5 mm diam. *Antherae* c. 2 mm longae. *Glandulae hypogynae* late ovatae, liberae. *Ovarium* rufo-ferrugineo-hirsutum, stylo in parte inferiore pilis paucis obsito, superne glabro. *Fructus* drupaceus ovoideo-ellipsoideus, in vivo caeruleus, 1—1.3 cm longus, 1 cm diam., exocarpio succulento, endocarpio cartilagineo.

AUSTRALIA. NE. New S. Wales. Clarence River: *Moore 235* (MEL, *typus H. ferrugin.*; K); ibid.: *Moore 115* (MEL, syntype); ibid.: *Camfield*. Richmond River: *Moore*. Uralba: *Bauerlen* (A; BRI, *typus H. bauerlenii*, haud vidi). Chillingham, Upper

Tweed River, and Mullumbimby: *Bauerlen, Dixon*, cit. White, haud vidi. Murwillumbah: *Bauerlen*. SE. Queensland. Macpherson Range and Lamington National Park, cit. Francis, haud vidi.

10. H. sellae-montis Sleum., Bot. Jahrb. 70, 1939, 142.

Arbor parva, ramulis teretibus, recentissimis fulvo-tomentosis, vetustioribus glabris et griseo-corticatis. *Folia* ± anguste oblonga, apice sensim acuminata, apice ipso ± acuta, basi ± longe in petiolum subcrassum c. 3 mm longum rufo-tomentosum cuneata, subcoriacea, in sicco plerumque nigrescentia, subtus pallidiora, supra glabra et nitentia, subtus per totam faciem imprimis ad costam et nervos rufo-tomentosa, demum costa nervisque exceptis glabrescentia, integra, (11—)12.5—15 cm longa, 4.5—6 cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 9—10 subarcuatis parum distincte inter sese conjunctis supra planis, sed colore dilutiore in sicco bene visibilibus, subtus parum prominentibus, venis utrinque laxe reticulatis supra planis vel leviter immersis, subtus minute prominulis, venulis supra ± indistinctis. *Racemi* ex axillis foliorum delapsorum summorum orti, 9—11 cm longi, maturitate fructuum incipiente usque ad 18 cm elongati. *Rhachis* gracilis, rufo-tomentosa, floribus sessilibus vel subsessilibus, solitariis vel binis. *Bracteae* lanceolatae, minutae. *Perianthium* 5 (rarius usque ad 6) mm longum, in vivo albidum vel flavescens, fusco-ferrugineo-hirsutum, limbo 1 mm diam. *Antherae* c. 1.5 mm longae. *Glandulae hypogynae* minutae, inferne connatae, superne liberae. *Ovarium* rufo-pilosum, stylo gracili glabro. *Fructus* maturus ellipsoideus, forma pruni insititiae, extus brevissime dilute brunneo-velutinus, 5.5 cm longus, 2.5—3 cm diam., pericarpio subcrustaceo 2 mm crasso; pedicelli fructiferi solitarii vel gemini, incrassati, 1—1.5 mm longi.

NEW GUINEA. NE. New Guinea. Morobe Distr., Sattelberg, c. 900 m: *Clemens 1790* (B, *typus*); ibid., c. 1000 m: *Clemens 2248*. Kalassa, Cromwell Range, 1300—1500 m: *Clemens 7925, 7961A* (B †), fr.

11. H. amplifolia Sleum., Bot. Jahrb. 70, 1939, 143.

Arbor, trunco 15—20 cm diam., ramulis crassis subteretibus, novellis fusco-tomentosis, vetustioribus glabrescentibus. *Folia* magna, late oblonga vel elliptica, brevissime petiolata, apicem versus sensim acuminata, apice ipso brevi obtusiuscula, basi latissime in petiolum attenuata vel ± rotundata, rigide chartacea, juniora supra pilis brevibus dilute ferrugineis laxe adspersa, in costa densius pubescentia, subtus saturate fusco-, rarius fusco-ferrugineo-velutina vel -tomentosa, vetustiora matura supra omnino glabrescentia, subtus in costa nervisque ± conspicue fusco-velutina vel -pilosa, in sicco olivaceo-brunnea, integra, (20—)23—40 cm longa, (10—)14—19 cm lata, costa supra bene, subtus valde prominente, nervis lateralibus utroque latere 14—15 arcuatis et margine excurrentibus, aliis intercalaribus paucis minus distinctis intermixtis, venis venulisque supra vix, subtus parum elevatis laxeque reticulatis; petiolus rufo-tomentosus, 7—9 mm longus, 3—4 mm diam. *Racemi* e ramis validioribus supra cicatrices foliorum delapsorum orti, densiflori, omnino rufo-tomentosi, 7—8 cm longi. *Rhachis* fere villosa, 2 mm diam. *Bracteae* subulatae, 1 mm longa. *Pedicelli* liberi, c. 1 mm longi. *Perianthium* flavidum, 9 mm longum, limbo 1.5 mm diam. *Antherae* c. 2 mm longae. *Glandulae hypogynae* liberae, late oblongae. *Ovarium* rufo-hirsutum, stylo filiformi glabro. *Fructus* ellipsoideus, 4.5 cm longus, fere 3 cm diam., pericarpio crustaceo 4 mm crasso.

NEW GUINEA. NE. New Guinea. Morobe Distr., Sattelberg, 900 m: *Clemens 1693* (A; B, *typus*; L); ibid., c. 1050 m: *Clemens 1845* (B †), fr.; Quembung Mission, c. 600 m: *Clemens 2264.*

12. H. platyphylla Sleum., Bot. Jahrb. 70, 1939, 144.

Arbor parva, ramulis apicibus rufo-tomentosis, ceterum glabris. *Folia* ampla, ad ramulorum apices pauca, late oblonga, pro magnitudine brevissime petiolata, apice sensim vel ± abrupte acuminata, apice ipso 3—4 cm longo subacuta, in petiolum cuneata, basi ipsa ± acuta, rigide chartacea vel subcoriacea, in sicco saturate rubro-brunnea, supra glabra et nitidula, subtus per totam faciem, imprimis ad costam nervosque saturate rufo-tomentosa, integra, (30—)40—45 cm longa, (13—)16—20 cm lata, costa supra bene, subtus crasse prominente, nervis lateralibus utroque latere 15—17, ceteris intercalaribus haud usque ad marginem productis numerosis, omnibus curvatis et supra fere planis, rarius subimmersis, subtus prominentibus, venis venulisque laxis supra minutissime sed visibiliter, subtus distincte reticulato-elevatis; petiolus rufo-tomentosus, c. 1 cm longus, 3—4 mm crassus. *Racemi* ex axillis foliorum delapsorum orti, ubique rufo-tomentosi, densiflori, 8—11 cm longi. *Rhachis* 2 mm crassa, fere usque ad basin florigera. Bracteae minutae. *Pedicelli* plerumque bini, 1—2 mm longi, usque ad medium connati, crassiusculi. *Perianthium* 11(—12) mm longum, in vivo pallide rosaceum, limbo 1.5 mm diam. *Antherae* c. 3 mm longae. *Glandulae hypogynae* fere quadratae, liberae. *Ovarium* rufo-hirsutum, stylo glabro filiformi. *Fructus* adhuc ignotus.

NEW GUINEA. Papua. Western Distr., Lower Fly River, east bank opp. Sturt Island: *Brass 8013* (A; B, *typus*; L).

13. H. loranthoides Presl, Epim. 1851, 247; Walp., Ann. 3, 1852/53, 332; Meisn. in DC., Prodr. 14, 1856, 438; Miq., Fl. Ind. Bat. I, 1, 1858, 984; F.-Vill., Nov. App. 1880, 182; Vid., Phan. Cuming. Philip. 1885, 140; Rev. Pl. Vasc. Filip. 1886, 229; Merr., En. Philip. 2, 1923, 99 pr. p.

Arbor gracilis, 3—10 m alta, trunco 10—25 cm diam., cortice saturate brunneo lenticellis dense obtecto. *Ramuli* teretes, novelli diutius saturate ferrugineo- vel griseo-flavescenti-tomentosi, tarde (tempore fructuum) glabrati. *Folia* obovata vel oblongo-obovata, rarius oblonga, apice ± late attenuata, apice ipso subrotundato-obtusa, rarius obtuse acuminata, basi in petiolum cuneata et ± decurrentia, satis coriacea, rigida, in vivo supra dilute viridia, subtus glauco-viridia, in sicco supra plerumque flavo-viridia et initio ferrugineo-sericeo-tomentella, sed citissime glabrata et subnitentia, subtus pallidiora, opaca, initio ± dense ferrugineo-tomentosa, cito omnino glabrescentia et cinerascenti-glaucescentia, integra rarius subdentata, (5—)6—8(—10, rarius ad 14) cm longa, (2.5—)2.8—4(—5.5) cm lata, costa supra fere plana, subtus ± distincte elevata, nervis lateralibus utroque latere 5—7 in parte basali subrectis, superne arcuatis interque sese conjunctis, utrinque parum sed distincte prominulis, venis venulisque utrinque laete denseque reticulatis et prominulis; petiolus applanatus, primo tomentellus, cito glabrescens, 0.8—1.5(—2) cm longus. *Racemi* solitarii rarius gemini, erecti, ex axillis summis orti, initio in omnibus partibus rufo-ferrugineo-tomentosi, tomento in perianthiorum apicibus saepius ± rarescente, 8—17 cm longi, fere ad basin densiflori. *Rhachis* 1.5—2 mm crassa. *Bracteae* anguste ovatae, acutiusculae, 1—2 mm longae. *Pedicelli* plerumque gemini, liberi vel usque ad medium connati, sub anthesi 2—3 mm longi, ± crassiusculi, sub fructu paullo accrescentes. *Perianthium* (7—)8—9 mm longum, in vivo albidum vel flavidum, tubo 0.6—1 (raro usque ad 1.5) mm diam., limbo ± 1.5 mm diam. *Antherae* 1.6 mm longae. *Glandulae hypogynae* parvae, liberae, approximatae. *Ovarium* ferrugineo-villosum, stylo gracili glabro. *Fructus* ovoideo-ellipsoideus, in sicco nigrescens, glaber, minute verruculosus, c. 1 (rarius usque ad 1.5) cm longus, (0.6—)0.8—1 cm diam., pericarpio ± 0.6 mm crasso.

PHILIPPINES. Luzon. Cagayan, Cagua Volcano: *B. S. 78389 Edaño*; Mt Tabuan, c. 1850 m: *B. S. 77089 Ramos*. Nueva Vizcaya: *B. S. 8203 Ramos*. Tayabas, Lucban: *Elmer 9223*. Bataan, Lamao River, Mt Mariveles: *Whitford 171, 460*. Rizal, Montalban: *B. S. 12371 Loher*. Laguna, Dahican River: *B. S. 1128 Ramos* (glabrescent form); Banahao, *Loher 6747*. Albay: *Cuming 858* (B, BM, K, L, MEL, NY, P; PR, *typus H. loranth.*, haud vidi). Sorsogon, Mt Bulusan: *P. N. H. 2643 Sulit, B. S. 23660 Ramos*. Catanduanes. Loco spec. haud ind.: *B. S. 30202 Ramos*; Mt Abucay, c. 1500 m: *B. S. 75239, 75253 Ramos & Edaño*. Leyte. Cabalian: *B. S. 41485 Ramos*. Mindanao. Bukidnon, Mt Candoon: *B. S. 38879 Ramos & Edaño*, Mt Dumalucpihan: *B. S. 38969 Ramos & Edaño*. Davao, Todaya, Mt Apo: *Elmer 11840*. Palawan. Mt Balagbag, c. 1150 m: *B. S. 77817 Edaño*.

14. H. celebica Sleum. sp. nov. — H. *excelsa* (Roxb.) Bl. var. Koord., Dienstr. Minah., Meded. 's Lands Plantent. 19, 1899, 576. — *H. excelsa* (Roxb.) Bl. var. *celebica* Koord. in Koord.-Schumach., Syst. Verz. 3. Abt. 1914, 38, nom. nud.. — *Finschia excelsa* (Roxb.) Bl. ex Boerl., Handl. 3, 1, 1900, 151, errore pro *H. excelsa* var. (Celebes); de Clercq, Nieuw Plantk. Woordenb. 1909, 242.

Arbor usque ad 24 m alta ,trunco 30 cm diam., ramulis in partibus recentissimis et annotinis florigeris fusco-ferrugineo-tomentosis, demum glabratis. *Folia* oblongo-lanceolata, apicem versus sensim acuminata, subacuta, basi in petiolum brevissimum cuneata et decurrentia itaque subsessilia, novella tenuiora utrinque tomento rufo-ferrugineo obtecta cito glabrescentia, adulta subcoriacea costaque diutius tomentella excepta glabra, in sicco flavido-viridia et supra nitentia, subtus opaca, integra, 8—15 cm longa, 2.5—4 cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 6—8 arcuato-ascendentibus, inter sese curvato-conjunctis, supra pallidioribus fere planis, subtus elevatis, venis venulisque utrinque dense reticulato-prominulis; petiolus crassus, applanatus, vix 2—3 mm longus, in foliis basi minus distincte decurrentibus paullo longior. *Racemi* ex axillis summis singuli rarius bini, erecti, fere usque ad basin sat densiflori, in omnibus partibus aequaliter fusco-ferrugineo-tomentosi, 8—15 cm longi. *Rhachis* 1.5—2 mm diam. *Bracteae* ovato-acuminatae, c. 1.2 mm longae, sicut bracteolae diutius persistentes. *Pedicelli* plerumque bini, liberi vel usque ad medium connati, crassiusculi, sub anthesi 3—4 mm longi, postea paullo accrescentes. *Perianthium* in vivo dilute viride, c. 8 mm longum, apice basique subgloboso-inflatum, tubo 1 mm diam. *Antherae* c. 1.5 mm longae. *Glandulae hypogynae* truncatae, brevissimae, liberae. *Ovarium* subglobosum, rufo-ferrugineo-villosum, stylo gracili glabro. *Fructus* ± oblique ovoideo-ellipsoideus, basi brevissime contractus, in vivo viridis vel demum (sicut in sicco) nigrescens, minute verruculosus, 1.5—1.8 cm longus, 1.2—1.5 cm diam., uniseminatus, pericarpio ± 0.6 mm crasso.

NE. CELEBES. Minahasa. Biv. Lolombulan, near Paku-urè, 700 m: *Koorders 18529* (BO, *typus*; L), fl. fr. 13-IV-95, rare; ibid., 450 m: *Koorders 17516*, fr. immat. 4-IV-95; G. Klabat, 800—1600 m: *Koorders 18513, 19582.*

15. H. rigidiflora Sleum. sp. nov. — *H. loranthoides* (non Presl) Merr., En. Philip. 2, 1923, 99, pr. p.

Arbor. *Ramuli* diutius rufo- vel rufo-cinerascenti-tomentosi, teretes, sat crassi. *Folia* obovata usque oblongo-obovata, apice breviter acuminata et subacuta, basi in petiolum cuneata, in superiore petioli tertio tantum decurrentia, firmule subcoriacea, in sicco viridescenti- vel brunnescenti-flavescentia, supra nitida, subtus opaca et paullo pallidiora, subtus ad costam et ad petiolum diutius rufo-tomentella, ceterum glabra, integra, (5—)6—10 (—12) cm longa, 3—5(—6.5) cm lata, costa supra parum, subtus sat crasse prominente, nervis lateralibus utroque latere 6—8 curvato-ascendentibus, nonnullis intercalaribus brevioribus intermixtis, omnibus utrinque prominentibus, venis venulisque utrinque dense prominulo-reticulatis; petiolus paullo applanatus, 1—1.5(—2) cm longus. *Racemi* axillares, e ramulis annotinis rufo-tomentosis orti, fere usque ad basin sat laxiflori, 8—10 cm longi, ubique rufo-tomentosi. *Rhachis* crassiuscula, 2 mm diam. *Bracteae* ovatae, fere 2 mm longae, tomento crispulo fere occultae. *Pedicelli* plerumque bini et ± usque ad medium connati, crassiusculi, 3—5 mm longi. *Perianthium* sat crassum, rigidulum, 10—11 mm longum, tubo 1.5 mm diam., limbo breviter clavato 2 mm diam. *Antherae* c. 1.5 mm longae. *Glandulae hypogynae* oblongo-ovatae, liberae, distantes. *Ovarium* globosum, rufo-villosum, stylo glabro gracili. *Fructus* subovoideo-globosus, in sicco nigrescens, glaber, dense minuteque verruculosus, 1.8—2.2 cm diam., pericarpio coriaceo c. 2 mm crasso.

PHILIPPINES. Mindoro. Paluan: *B. S. 39591 Ramos.* Mindanao. Misamis, Mt Malindang: *F. B. 4549 Mearns & Hutchinson.* Bukidnon, Mt Candoon: *B. S. 38715 Ramos & Edaño* (A, *typus*; NY), fl. VI/VII-20.

16. H. fuscotomentosa Suesseng., Mitt. Bot. Staatssamml. München 2, 1950, 61; in Heine, Fedde Rep. 54, 1951, 225.

Arbor 10—15 m alta, ramulis junioribus teretibus sat crassis diutius saturate rufo- (vel demum griseo-flavescenti-)tomentosis, vetustioribus glabratis brunnescentibus. *Folia* elliptica usque oblongo-elliptica, apicem versus sensim vel subabrupte acuminata, subacuta, basin versus in petiolum cuneata, novella rufo-tomentosa sed citissime glabrescentia, sub anthesi costa excepta glabra, adulta omnino glabra, subcoriacea, utrinque nitentia, in sicco flavido-viridia usque olivacea, integra, (5—)8—12(—18, rarissime usque ad 26) cm longa, (3.5—)4—6(—8, rarissime usque ad 11) cm lata, costa supra vix, subtus ± distinctae prominente, nervis lateralibus utroque latere (5—)6—8 (—9), curvatis, ± manifeste arcuato-conjunctis, utrinque prominentibus, venis venulisque utrinque dense laeteque reticulato-prominulis; petiolus 1.5—2(—2.5) mm crassus, 1—2 cm longus, initio tomentellus, deinde glabrescens. *Racemi* axillares solitarii, subdensi, 6—8 cm longi, fere usque ad basin floriferi, in omnibus partibus pilis rufis crispulis tomentosi vel subvillosi. *Rhachis* 1.5—2 mm diam. *Bracteae* ovato-acuminatae 1—1.5 mm longae, sicut bracteolae subpersistentes. *Pedicelli* crassiusculi, sub plena anthesi 1—2 (infimi raro usque ad 3) mm longi, plerumque gemini et ± connati. *Perianthium* 11—12 mm longum, tubo c. 1.5 mm diam., limbo clavato 2—2.5 mm diam. *Antherae* fere 2 mm longae. *Glandulae hypogynae* late deltoideae, obtusae, liberae, distantes. *Ovarium* globosum, rufo-villosum, stylo gracili glabro. *Fructus* fere maturus oblique elongato-ellipsoideus vel ovoideus, apiculatus, basi breviter attenuatus, rufo-tomentosus, 2.5—3 cm longus, c. 2 cm crassus, pericarpia 2 mm crasso, pedicello 2—3 mm longo.

BORNEO. Br. N. Borneo. Mt Kinabalu, Tenompok, E of Lodge, c. 1500 m: *J. & M. Clemens 28724* (A, B, BM, L; M, *typus*; NY); ibid., Menetendok, Kinataki divide, c. 1050 m: *Carr SF 26710*. Sandakan, Kabili For. Res.: *For. Dep. F.M.S. 49006* (*S.H. 10232*). Sarawak. Mt. Poi, c. 1350 m: *J. & M. Clemens 20386*. SE. Borneo. W. Kutei, near Mt Kemul: *Endert 3890*. W. Borneo. Melawi, B. Badak buruk, 350 m: *NIFS bb. 28336*.

17. **H. rufescens Prain,** Kew Bull. 1912, 342; Gamble, J. As. Soc. Beng. 75, ii, 1914, 435; Ridl., Fl. Mal. Pen. 3, 1924, 142; Burk. & Henders., Gard. Bull. Str. S. 3, 1925, 417; Burk., Dict. 1935, 1134.

Arbor 10—24 m alta, trunco usque ad 60 cm diam., ramis patulis, ramulis crassis, novellis subteretibus diutius rufo-tomentosis, demum glabratis, fusco-cinereis. *Folia* obovata vel obovato-oblonga, rarius late oblanceolata (in regionibus editis minora et angustiora), apice breviter attenuata, subacuta, usque subrotundato-obtusa, basi ± longe cuneata et in petiolum ± decurrentia, subcoriacea, supra in vivo saturate viridia, subtus rubescenti-brunnescentia, in sicco supra olivacea usque nigrescentia, subtus paullo pallidiora et ± saturate castanea, novella utrinque rufo-tomentosa, matura supra costa pilosa excepta glabrata et nitidula, subtus diutius per faciem saturate pilis ± crispulis rufo-tomentosa, demum costa nervisque exceptis glabrescentia, integra (sed in turionibus interdum uncinato-serrata), normaliter 13—23(—30) cm longa et (5—)6—11 cm lata, in turionibus usque ad 40 cm longa et usque ad 13 cm lata, costa utrinque elevata, nervis lateralibus utroque latere 9—12 (in turionibus raro numerosioribus) inferioribus approximatis, rectiusculis, interque sese ± parallelis, superioribus ± distantibus, leviter curvatis et distinctius arcuato-conjunctis, omnibus subtus tantum prominulis, venis irregulariter areolatis, cum venulis reticulatis utrinque parum distinctis; petiolus rufo-tomentosus, in foliis inferioribus 3—4 (rarius usque ad 5) cm longus, basi 2—3 mm crassus, in foliis summis gracilior, 1.5—1 cm longus, in turionibus usque ad 7 cm elongatus. *Racemi* axillares vel plerumque e nodis defoliatis singuli vel bini, (10—)15—20 cm longi, densiflori, omnino rufo-tomentosi. *Rhachis* 1.5—2 mm crassa. *Bracteae* ovatae, minutae. *Pedicelli* crassiusculi plerumque gemini, usque ad medium connati, 1—2(—3) cm longi. *Perianthium* 12 mm longum, tubo 0.8 mm diam., limbo clavato 1.5 mm diam. *Antherae* fere 2 mm longae. *Glandulae hypogynae* liberae, obtusae. *Ovarium* rufo-villosum, stylo gracili glabro. *Fructus* subglobosus, utrinque complanatus, apice basique late attenuatus, basi saepius breviter in pedem crassum contractus, in vivo flavido-brunnescens, initio breviter rufo-tomentosus, demum ± glabrescens, 2.5—3 cm longus, 2—2.5 cm latus, 1.5—1.8 cm crassus. Pericarpium coriaceum, 1 mm crassum. Pedicelli fructiferi alte connati, 6—7 mm longi, basi c. 2 mm crassi.

MALAY PENINSULA. Perak. Larut: *Kunstler 4213* (cit. Prain, haud vidi), *4939*, *5096*. Thaiping waterfall: *Kunstler 8504* (K, *lecto-typus*), fr.; Waterfall Hill and Tapai: *Wray 2083* (cit. Prain, haud vidi), *3084* (cit. Prain, haud vidi). Gunung Bubu: *Scortechini 774*. Kedah. Ulu Sira, Gunung Bintang: *Haniff SF 21033*. Pahang. Cameron Highlands, Gunong Berembun, c. 1500 m: *Henderson SF 23388*; ibid., Boh Plantations,

c. 1200 m: *Nur SF 32562*. Johore. Endau-Mersing road: *Corner*. Sungei Kayu: *Kiah SF 32065, 32327, Corner SF 30856*.

18. H. longespicata Sleum., Bot. Jahrb. 70, 1939, 143.

Arbor c. 8 m alta, ramulis novellis fusco-tomentosis serius ± glabrescentibus. Folia ampla, oblonga, apice rotundata vel late obtuse attenuata, basi late cuneata, parum inaequilateralia, tenuiter subcoriacea vel chartacea, in sicco saturate brunnea, supra costa fusco-tomentosa excepta vel omnino glabra, subtus initio per faciem laxe brevissime fusco-tomentella, mox costa nervisque exceptis glabrescentia, integra, (18—)21—26(—33) cm longa, (6.5—)9—12(—13) cm lata, costa utrinque prominente, nervis lateralibus utroque latere c. 10 curvatis, supra vix, subtus parum sed distincte prominentibus, venis venulisque utrinque subdense reticulato-prominulis; petiolus fusco-tomentosus, basi 4 mm, in medio 2.5 mm crassus, 1.2—1.8 cm longus. *Racemi* spicaeformes, pedunculo 4—5 cm longo incluso (17—)22—27 cm longi, fusco-tomentosi. *Rhachis* gracilis, 1 mm diam. *Bracteae* minutae. *Pedicelli* gemini, ± connati, 1—1.5 mm longi. *Perianthium* pallide viride, 8 mm longum, apice 1 mm diam., in specimine fere plane maturum. *Antherae* c. 1.5 mm longae. *Glandulae hypogynae* basi connatae. *Ovarium* dense ferrugineo-pilosum, stylo gracillimo glabro. *Fructus* adhuc ignotus.

NEW GUINEA. Papua. Centr. Distr., Isuarava, c. 1500 m: *Carr 15579* (A; B, *typus*; BM, K, L, SING).

19. H. kjellbergii Sleum. sp. nov.

Arbor 4—8 (interdum usque ad 20) m alta, ramulis novellis subangulatis in sicco rubescentibus, glabris, vetustioribus teretibus cinerascentibus. *Folia* oblonga, apice breviter (1—1.5 cm longe) obtuse acuminata, basi in petiolum ± alatum cuneata et decurrentia, subsessilia, subcoriacea, etiam novella glabra vel hic inde subtus pilo solitario induta, in sicco supra viridi-castanea valdeque lucida, subtus dilutius castanea et opaca, integra, (—9) 10—18 cm longa, 4.5—6.5 cm lata, costa supra parum, subtus manifeste prominente, nervis lateralibus utroque latere 8—10(—12) arcuato-ascendentibus obscure inter sese curvato-conjunctis supra minute, subtus parum elevatis, venis venulisque utrinque ± inconspicuis; petiolus 2—3 mm longus, basi ipsa valde incrassatus, glaber. *Racemi* ex axillis summis orti, solitarii vel haud raro bini, ascendentes demum inclinati, fere usque ad basin sat dense florigeri, 7—10 cm longi, sub fructu usque ad 13 cm accrescentes. *Rhachis* 1—1.5 mm crassa, sicut pedicelli bracteaeque dense saturate ferrugineo-tomentosa. *Bracteae* subovato-lanceolatae, 1.5 mm longae. *Pedicelli* sub anthesi 2—3 mm longi, saepius gemini et usque ad medium fere connati, in superiore tertio glabrescentes. *Perianthium* in vivo albidum, 7—8 mm longum, extus laxe usque subdense pilis ferrugineis ± adpressis indutum, tubo 0.5 mm diam., limbo clavato 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* subcrassae, late obovatae, truncatae, 0.5 mm altae, liberae, approximatae. *Ovarium* obovoideo-globosum, laxe pilis dilute ferrugineis longis crispulis indutum, cito ± glabrescens, stylo gracili glabro. *Fructus*, ut videtur nondum plane maturus, ellipsoideus, glaber, in vivo et in sicco nigrescens, minutissime verruculosus, 9—11 mm longus, 7—9 mm diam., pericarpio 0.7 mm crasso.

CELEBES. SE. Celebes. Kendari, Puhara, 100 m: *Kjellberg 744* (BO, *typus*; S), in sec. thicket, fl. fr. imm.

Similar in leaf-characters, but determination not certain, as no flowers are present:

CELEBES. SE. Celebes. Lepo-lepo: *Beccari* anno 1874 (FI).
FLORES. Endeh, Ndona, 750 m: *NIFS bb. 8917*.

19a. var. **calva** Sleum. var. nov. — A typo ovario ab initio glabro, inflorescentia minus dense ferrugineo-pilosa, foliis lanceolato-oblongis 3.5—4.5 cm latis diversa. Fructus maturus ellipsoideus, basi brevissime contractus, 1.5 cm longus, 1—1.2 cm in diam., pericarpio 1 mm crasso.

CELEBES. C. Celebes. Masamba, Kaluku, 200 m: *NIFS bb. 20047* (BO, *typus*), rare in primary forest, hilly clayey ground.

20. H. carrii Sleum., Bot. Jahrb. 70, 1939, 145. — *H. brassii* Sleum., l. c. 146. — *H. divaricata* Sleum., l. c. 146.

Arbor 5—10 m alta, ramulis teretibus, novellis fusco-ferrugineo-tomentosis, vetustioribus glabrescentibus et griseo- vel brunneo-corticatis. *Folia* oblonga vel lanceolato-oblonga, rarius subelliptico-oblonga, apice sensim sat breviter acuminata, acutiuscula vel obtusa, basi in petiolum attenuata, ± firmule chartacea, in sicco flavescenti-viridia vel dilute olivacea, integra vel apices versus remote subdenticulata, supra costa diutius tomentella excepta glabra et nitentia, subtus ± opaca atque ad costam et nervos ± dense et diutius, in facie laxe fusco-ferrugineo pilosa, serius ± glabrescentia, (4.5—)5—9(—14) cm longa, (1.8—)2.5—4(—5.5) cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere (6—)7—8(—10) subcurvatis, margine inter sese ± manifeste conjunctis, subtus parum prominentibus, venis venulisque supra obscure vel parum, subtus distincte et ± dense reticulato-prominulis; petiolus crassiusculus diutius fusco-ferrugineo-tomentellus (0.7—)1—1.5 cm longus. *Racemi* axillares vel saepius ex axillis foliorum delapsorum orti, densiflori, in omnibus partibus ferrugineo-tomentosi, 8—11 cm longi. *Rhachis* in medio 1.5—2 mm crassa, basi crassior. *Bracteae* ovato-subacuminatae, 1—1.5 mm longae, saepius tomento crispulo ± occultae. *Pedicelli* crassiusculi 3—5 mm longi, plerumque bini et usque ad medium connati. *Perianthium* (16—)17—20 mm longum, extus in vivo castaneum, intus flavescens, tubo in medio 1.2—1.5 mm diam., limbo sensim clavato 5—6 mm longo et ± 2.5 mm diam. *Antherae* 3—4 mm longae. *Glandulae hypogynae* brevissimae, vix 1 mm altae, ± connatae itaque annulum formantes. *Ovarium* dense fusco-ferrugineo-pilosum, stylo gracili glabro. *Fructus* immaturus subglobosus, laxe rufopilosus, in sicco nigrescens.

NEW GUINEA. Papua. Central Distr., Alola, c. 1600 m: *Carr 14148* (A; B, *typus H. carrii*; BM, K, L, NY, SING). Boridi, c. 1500 m: *Carr 13508* (B, *typus H. divaricat.*; BM, K, L, NY, SING), *14378*. Mt Tafa, 2400 m: *Brass 5063* (A; NY, *typus H. brassii*). Lala River, c. 1500 m: *Carr 15817*.

There exist small differences between the holotype-specimens of the 3 species originally kept apart, but additional material has more or less broken down these. It seems therefore desirable to recognize only one species.

21. H. purpurascens Sleum. sp. nov.

Arbor usque ad 12 m alta, ramulis recentissimis cum foliis novellis dense adpresse fusco-ferrugineo-pilosis, vetustioribus compressis, glabrescentibus, griseo-corticatis lenticellisque numerosis ellipticis obsitis. *Folia* oblonga vel lanceolato-oblonga, apice breviter (1—1.5 cm longe) subabrupte acuminata, subacuta, basi in petiolum attenuata et ± manifeste decurrentia, matura firmule subcoriacea, glabra, in vivo saturate viridia, in sicco supra dilute viridescenti-flavida et nitentia, subtus castaneo-olivacea et opaca, integra, (9—)10—15 cm longa, 4—5 cm lata, costa supra parum, subtus crasse prominente, nervis lateralibus utroque latere 10—11(—12) a costa angulo magno abientibus, inferne subrectis, in superiore parte demum curvatis et praeter marginem manifeste curvato-conjunctis, supra parum, subtus manifestius prominulis et discoloribus, venis cum venulis irregulariter areolatis utrinque dense prominulo-reticulatis; petiolus crassus, 0.5—1(—1.3) cm longus, basi incrassatus. *Racemi* ex axillis foliorum delapsorum orti, pedunculo c. 10 cm longo incluso c. 30 cm longi, densiflori, ubique sat dense pilis longis rufo-ferrugineis adpressis ornati. *Rhachis* 2—2.5 mm diam. *Bracteae* ovato-lanceolatae, acutae, interdum cito glabrescentes, 2—3 mm longa, plerumque cito caducae. *Pedicelli* sat graciles, plerumque gemini, 5—8 mm longi, liberi vel usque ad medium connati. *Perianthium* in vivo purpurascens, 20—23 mm longum, tubo 0.7 mm diam., limbo ellipsoideo 2—2.5 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* crassae, 1 mm altae, superne liberae, inferne connatae, minute punctatae. *Ovarium* dense rufopilosum, stylo gracili glabro. *Fructus* adhuc ignotus.

NEW GUINEA. Papua. Western Highland, Nondugl: *N. G. F. 4386 Womersley* (A, K; L, *typus*; LAE), fl. deep plum red, Apr. 51.

22. H. torricellensis Lauterb. in Schum. & Lauterb., Nachtr. Fl. Deut. Schutzgeb. Südsee 1905, 257; Lauterb., Bot. Jahrb. 50, 1913, 331.

Arbor humilis, ramulis teretibus, novellis fusco-tomentosis, mox glabratis, vetustioribus brunnescenti- vel cinereo-corticatis, rugosis. *Folia* lanceolata, apicem versus ± longe sensim acuminata, obtusiuscula, basin versus in petiolum cuneata et ± manifeste decurrentia, tenuiter subcoriacea, in sicco olivaceo-virentia, supra subnitida costa diutius pilosula excepta glabra, subtus pallidiora, novella subtus passim pilis solitariis dilute ferrugineis adpressis induta, matura costa laxe pilosula excepta glabra, demum glaberrima, integra, 7—14 cm longa, 2—3.5 cm lata, costa supra parum, subtus manifeste elevata, nervis lateralibus utroque latere c. 10 subrectis interque sese ± parallelis, marginem versus curvatis et conjunctis, supra vix, subtus bene prominentibus, venis venulisque utrinque densissime prominulo-reticulatis; petiolus paullo applanatus et subalatus, glaber, 2—10 mm longus. *Racemi* ex axillis foliorum delapsorum orti, densiflori, 12—14 cm longi, ubique sat dense rufo-ferrugineo-pilosi. *Rhachis* 1—1.5 mm diam. *Bracteae* ovato-lanceolatae, subglabrae, c. 2 mm longae. *Pedicelli* c. 2 mm longi, plerumque bini et usque ad medium connati. *Perianthium* in vivo albidum, subdense pilis longis rufis adpressis ornatum, gracile, (13—)14—15 mm longum, tubo 0.5 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* c. 2 mm longae. *Glandulae hypogynae* crassiusculae, subquadratae, liberae, approximatae itaque annulum formantes. *Ovarium* rufo-tomentosum, stylo gracili glabro. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Sepik Distr., Torricelli Mts, 1000 m: *Schlechter 14351* (B, *typus*; BM, BO, K, P).

23. H. schlechteri Lauterb. in Schum. & Lauterb., Nachtr. Fl. Deut. Schutzgeb. Südsee 1905, 256; Lauterb., Bot. Jahrb. 50, 1913, 333, fig. 2.

Arbuscula, ramulis gracilibus teretibus, recentissimis adpresse rufo-ferrugineo-tomentosis, vetustioribus glabris cinereo-corticatis. *Folia* lanceolata, apicem versus sensim longe acuminata, saepius subfalcata, subacuta, basi in petiolum attenuata et ± decurrentia, tenuiter subcoriacea, vel chartacea, glabra, supra nitidula, subtus opaca, in sicco utrinque dilute olivaceo-virescentia, integra, 10—18 cm longa, 2.3—5(—4) cm lata, costa utrinque prominente, nervis lateralibus utroque latere 8—10 ± arcuatis praeter marginem ± distincte anastomosantibus, utrinque prominulis vel supra leviter impressis, venis venulisque utrinque densissime prominulo-reticulatis; petiolus crassiusculus, applanatus, 2—8 mm longus. *Racemi* axillares, fere usque ad basin laxiflori, graciles, 13—30 cm longi, ubique subdense pilis rufis adpressis gracillimis obtecti. *Rhachis* 1 mm diam. *Bracteae* ovato-lanceolatae, acutae, 1—1.5 mm longae, cito caducae. *Pedicelli* 2 mm longi, plerumque gemini, ± liberi usque omnino connati. *Perianthium* albidum, tenue, c. 25 mm longum, tubo 0.6 mm diam., limbo 1.5 mm diam. *Antherae* 1.8 mm longae. *Glandulae hypogynae* liberae, minutae, truncatae. *Ovarium* dense adpresse rufo-pilosum, stylo gracillimo glabro. *Fructus* ignotus.

NEW GUINEA. N E. New Guinea. Sepik Distr., Torricelli Mts, 600 m: *Schlechter 14511* (B, *typus*; BM, BO, K, P).

24. H. lauterbachiana Sleum., Bot. Jahrb. 70, 1939, 147. — *H. grandifolia* Lauterb., Nova Guinea 8, Sept. 1910, 285; Bot. Jahrb. 50, 1913, 332, nec Lecomte (May 1910).

Arbuscula 3—4 m alta, ramulis teretibus glabris, innovationibus haud visis. *Folia* lanceolata vel subovato-lanceolata, apicem versus sensim acuminata, apice ipso obtusa, basi in petiolum brevissimum cuneata et decurrentia, subsessilia, coriacea, in sicco dilute castanea et paullo nitentia, glabra, integra, margine minute revoluta, 20—32 cm longa, 7—11 cm lata, costa crassa utrinque prominente, nervis lateralibus utroque latere 9—10(—11) curvato-ascendentibus, prope marginem arcuato-conjunctis, supra plerumque in sicco manifeste impressis, subtus prominentibus, venis venulisque densissime reticulatis utrinque parum sed bene visibiliter prominulis; petiolus rugosus, 4—6 mm longus, 2.5—4 mm crassus. *Racemi*, ut videtur, ex axillis foliorum delapsorum orti, graciles, 25—43 cm longi, valde laxiflori, ubique pilis rufo-ferrugineis longis adpressis subdense obtecti. *Rhachis* c. 1 mm diam. *Bracteae* minutae, lanceolatae, vix 1 mm longae, plerumque cito caducae. *Pedicelli* 2—3 mm longi, singuli vel bini, liberi vel ima basi connati. *Perianthium* in vivo album, 22—25 mm longum, tubo 0.5 mm diam., limbo ellipsoideo 1.5—2 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* late ovatae, liberae. *Ovarium* subglobosum, rufo-pilosum, stylo pergracili glabro. Fructus ignotus.

NEW GUINEA. S. New Guinea. Lorentz River (= Noord R.), Alkmaar: *Versteeg 1471* (B; BO, *typus*; K, L).

25. H. oreadum Diels, Bot. Jahrb. 54, 1916, 203. — *H. phaeotricha* Diels, l. c. 203. — *H. validinervis* White, Proc. R. Soc. Queensl. 34, 1922, 26; Sleum., Bot. Jahrb. 70, 1939, 147.

Arbuscula 3—6 m alta, ramulis novellis fusco-pilosis, vetustioribus cito glabrescentibus. *Folia* lanceolata vel anguste obovato-oblonga, apice sensim sat breviter (2—3 cm longe) acuminata, apice ipso subacuta, basi ± late in petiolum attenuata, paullo inaequilateralia, subcoriacea, in sicco pallide viridia, utrinque nitentia, supra glabra, subtus initio in facie passim, ad costam, nervos et petiolos densius subadpresse fusco-ferrugineo-pilosa, demum fere omnino glabrescentia, integra, (10—)12—22(—29) cm longa, (4.5—) 5—7(—9) cm lata, costa valida utrinque imprimis subtus prominente, nervis lateralibus utroque latere 9—11 subarcuatis inter sese ± parallelis et in nervum intramarginalem plerumque valde distinctum curvato-collectis, nervis intercalaribus minus manifestis pluribus, omnibus supra in sicco ± manifeste insculptis, subtus prominentibus, venis venulisque utrinqe dense reticulatis et conspicue prominulis; petiolus 1.5—2(—2.5) cm longus, basi 1.5—2 mm crassus. *Racemi* ex axillis foliorum interdum delapsorum orti, breviter pedunculati, ubique fusco-tomentosi, 18—28 cm longi, sat densiflori. *Rhachis* ± 1.5 mm diam. *Bracteae* ovato-lanceolatae, subpersistentes, saepius pedicellos longitudine fere aequantes. *Pedicelli* 1.5—2 mm longi, plerumque bini, liberi vel usque ad medium connati. *Perianthium* in vivo rosaceum usque purpurascens, gracile, c. 1.8 cm longum, tubo 0.6 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* carnosulae, liberae, dilatatae. *Ovarium* rufo-tomentosum, stylo gracili glabro. *Fructus* deest.

NEW GUINEA. NE. New Guinea. Sepik Distr., "Felsspitze", 1400—1500 m: *Ledermann 12491* (B, *typus H. oread.*). April River, c. 60 m: *Ledermann 8834* (B, *typus H. phaeotrich.*; K). Papua. Centr. Distr., Mekeo (between Ononge and Deva-Deva): *White 801* (BRI, *typus H. validinerv.*, haud vidi; K). Dieni, Ononge road, 500 m: *Brass 3891.*

Note. I unite *H. oreadum* and *H. validinervis,* both found at 500—1500 m on rain-forest ridges or slopes, with *H. phaeotricha,* described from lowland country, as no constant good characters are found in the leaves and flowers hitherto known, besides slight differences in the nervation and in the density of the tomentum of the inflorescences. The fruits, however, may yield characters, which might oblige to keep the three species separately again.

26. H. stelechantha Diels, Bot. Jahrb. 54, 1916, 202.

Arbuscula 4—5 m, trunco cortice griseo, ramulis teretibus, apicibus tantum dense adpresse ferrugineo-pilosis, in partibus vetustioribus glabris, in sicco dilute brunneis. *Folia* elliptica vel subobovato-elliptica, apice breviter acuminata, subacuta, basin versus in petiolum cuneata, paullo inaequilateralia, in vivo intense viridia el lucida, in sicco supra dilute olivaceo-viridia, subtus sublivida, utrinque subnitentia, glabra, remote serrata (dentibus prorsus versis in utroque latere 5—6, 1.5—3 mm altis et 1—3 cm distantibus), margine paullo revoluta, 10—24 cm longa, 5—10 cm lata, costa utrinque imprimis subtus prominente, nervis lateralibus utroque latere 8—10 inferne satis rectis, superne curvatis, inter sese ± parallelis atque prope marginem curvato-conjunctis, in sicco supra valde manifeste insculptis, subtus arcte prominentibus, venis venulisque utrinque dense reticulatis et prominulis, venis subtus quam venulae plerumqe magis elevatis; petiolus (1.5—)2—3 cm longus, basi valde incrassatus. *Racemi* graciles usque ad 25 cm longi, e caule enascentes, in omnibus partibus subdense adpresse rufo-ferrugineo-pilosi. *Brecteae* lineares, 2—2.5 cm longae. *Pedicelli* plerumque bini, paullo supra basin connati, sat graciles, 3—4.5 mm longi. *Perianthium* in vivo pallide rosaceum, 14—15 mm longum, tubo 0.5 mm diam., limbo 1.5 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* crassae, late obovatae, liberae. *Ovarium* rufo-tomentosum, stylo gracili glabro. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Sepik Distr., Schraderberg, 2070 m: *Ledermann 11882* (B, *typus*).

27. H. vestita W. W. Smith, Notes Bot. Gard. Edinb. 10, 1918, 181.

Arbor 8—10 m, trunco saepius tortuoso. *Ramuli* subteretes, novelli fusco-ferrugineo-tomentosi, tarde glabrescentes, vetustiores glabri et brunnei. *Folia* oblanceolata vel subovato-oblonga, apice saepius paullo curvato sensim acuminata, apice ipso subacuta vel plerumque obtusa, basin versus ± longe in petiolum cuneata, coriacea vel firmule subcoriacea, in sicco supra flavo-viridia et costa diutius tomentella excepta glabra, lucida, subtus initio per totam faciem tomento detersili rufo sat denso e pilis crispulis formato obtecta, tomento serius costa nervisque exceptis evanescente, interdum tarde omnino glabrata, integra vel undulata vel imprimis antice sat grosse obtuse serrata, 15—22(—28) cm longa, (5—)6—8(—10) cm lata, costa supra vix eminente, subtus prominente, nervis lateralibus utroque latere 9—12 supra prominulis, subtus manifestius elevatis, subarcuatis praeter marginem ± distincte venis transversis conjunctis, venis venulisque utrinque sat dense et conspicue reticulatis et prominulis; petiolus diutius rufo-tomentosus, (1—)1.5—2.5(—3) cm longus, c. 2 mm diam. *Racemi* axillares et subterminales erecti, fere usque ad basin densiflori, 8—14 cm longi, ubique rufo-ferrugineo-tomentosi. *Rhachis* c. 2 mm diam. *Bracteae* ovato-acuminatae, usque ad 2 mm longae, adpressae, saepius tomento ± occultae. *Pedicelli* crassi 1—2 mm longi, plerumque gemini et ± connati. *Perianthium* in vivo rubescens, 16—18(—20) mm longum, in tubo medio 0.8—1.2 mm diam., limbo clavato c. 2.5 mm diam. *Antherae* 3—4 mm longae. *Glandulae hypogynae* subquadratae, liberae, brevissimae. *Ovarium* rufo-tomentosum, stylo pergracili glabro. *Fructus* adhuc ignotus.

CHINA. Yunnan. S of Szemao, c. 1370 m: *Henry 12159* (B; E, *typus*; K, NY, US).

SIAM. NE. Siam. Loie, Phu Krading, 1300 m: *Thail. Roy. For. Dep. 3686 (Dee 83)*.

28. H. obovatifolia Merr. & Chun, Sunyatsenia 5, 1940, 45. — *H. vestita* W. W. Smith var. *mixta* Li, J. Arn. Arb. 24, 1943, 444 quoad pl. hainan. et kwangtung.

Arbor 9—20 m, cortice griseo-brunneo. *Ramuli* juniores rufo-ferrugineo-tomentosi, tarde glabrescentes, vetustiores glabri. *Folia* (late) obovata vel elliptico-obovata, apice late attenuata, valde obtusa usque rotundata, basi late sat breviter in petiolum cuneata parum decurrentia, novella subtus per faciem pilis rufo-ferrugineis crispulis tomentosa, adulta costa nervisque imprimis subtus diutius tomentellis exceptis glabra, subcoriacea vel coriacea, in sicco flavo-viridia, supra nitentia, integra vel plerumque imprimis antice sat grosse et obtuse (pauci-) serrata, (5—)8—15 (interdum usque ad 26) cm longa, (3—)4—8 (rarius usque ad 14) cm lata, costa supra fere plana, subtus prominente, nervis lateralibus utroque latere 8—10(—12) in parte inferiore subrectis, superne curvatis interque sese venis transversis ± arcuato-conjunctis, supra parum, subtus bene prominentibus, venis venulisque utrinque subdense reticulatis laeteque prominulis; petiolus diutius rufo-tomentosus, (1—)1.5—2(—3) cm longus. *Racemi* axillares solitarii, sat densiflori, 8—15 cm longi, ubique rufo-ferrugineo-tomentosi. *Rhachis* c. 2 mm diam. *Bracteae* ovato-acuminatae, obtusae, diu persistentes, 2 mm longae.

Pedicelli crassiusculi, 1—2 mm longi, ± liberi. *Perianthium* albidum vel flavidum, ± intense odoratum, 10—12 mm longum, tubo 0.6—0.8 mm diam., limbo 2 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* latae, truncatae, c. 0.7 mm altae. *Ovarium* rufo-villosum, stylo gracili glabro. *Fructus* ovoideus vel oblongo-ovoideus, obliquus et lateraliter compressus, subrostrato-acuminatus, rufo-pilosus vel glabrescens, in vivo initio viridis, demum purpureo-nigrescens, 4—4.5 cm longus, c. 2.5 cm latus, c. 2 cm crassus, pericarpio coriaceo 2 mm crasso.

CHINA. Hainan. Po-ting, 350 m: *How 73089* (A, *typus*; BM, P). Ling-shui distr.: *How 73795*. Manning: *Lau 28252*. Kwantung. Shih Wan Tai Shan: *Liang 69841*.

INDOCHINA. Annam. Quang-tri, massif de Dong-tri, 1000 m: *Poilane 11032*; massif de Dong Che, 400—500 m: *Poilane 10555*; massif de Hon-ba, 1000—1500 m: *Chevalier 38898*. Ba-na, près Tourane, 1500 m: *Poilane 6923, 7086* (→ var. *mixta*).

28a. var. **mixta** (Li) Sleum. comb. nov. — *H. vestita* W. W. Smith var. *mixta* Li, J. Arn. Arb. 24, 1943, 444 quoad typ. — *H. vestita* (non W. W. Smith) Li, J. Arn. Arb. 24, 1943, 363.

A typo foliis late oblanceolatis vel oblongo-obovatis apicem versus gradatim ± late attenuatis et obtusis diversa. Ut videtur, inter *H. vestit.* et *H. obovatifol.* intermedia, perianthio interdum usque ad 14 mm longo.

CHINA. Kwangsi. Shangtze distr., Shih Wan Tai Shan: *Tsang 22430*; Tseung yuen, Liow Shiang: *Wang 39624* (A, *typus*).

INDOCHINA. Tonkin. Dam-ha, Sai Wong Mo Shan: *Tsang 30083*. Annam. Col Mangiang, Qui Nhon, 1000—1200 m: *Poilane 18031*.

29. H. microneura White, J. Arn. Arb. 10, 1929, 209.

Arbor parva, gracilis, virgata. *Ramuli* in partibus junioribus adpresse ferrugineo-tomentosuli, ceterum glabri, teretes, griseo-corticati, graciles. *Folia* lanceolata vel oblongo-lanceolata, apice 0.5—1 cm longe subacute acuminata, basi in petiolum cuneata et decurrentia, firmule subcoriacea, supra in sicco saturate olivaceo-brunnea, subnitida et glabra, subtus dilutius brunnescentia, in facie et costa hic inde pilis adpressis obsita, cito omnino glabrescentia, antice utroque latere dentibus 2—4 vix 1 mm altis prorsus versis instructa, basin versus integra, (4—)5—7 cm longa, 2—2.5 cm lata, costa supra fere plana, subtus prominente, nervis lateralibus utrinsecus c. 8 distincte inter sese curvato-conjunctis, utrinque minute, sed visibiliter prominentibus, venis venulisque utrinque densissime reticulatis minuteque prominulis; petiolus 2—3 mm longus, basi valde incrassatus. *Racemi* axillares vel e nodis defoliatis solitarii, gracillimi, dense ± adpresse rufo-pilosi, 3—4.5 cm longi, fere usque ad basin satis laxiflori. *Rhachis* 0.5 mm diam. *Bracteae* haud visae. *Pedicelli* 0.5—1 mm longi, plerumque bini et ± usque ad apicem connati. *Perianthium* in vivo albidum, sat dense adpresse rufo-pilosum, serius glabrescens, c. 6 mm longum, tubo 0.5 mm diam., limbo 0.8 mm diam. *Antherae* 0.7 mm longae. *Glandulae hypogynae* sat crassae, late ovatae et truncatae, liberae, approximatae. *Ovarium* rufo-tomentosum, stylo gracili glabro. *Fructus* deest.

NEW GUINEA. Papua. Centr. Distr., Owen Stanley Range, between Mts Brown and Clarence, 900—1200 m: *Brass 1490* (B; BRI, *typus*, haud vidi; P).

30. H. dentellata Sleum., Bot. Jahrb. 70, 1939, 147.

Arbuscula 3—4 m alta, ramulis teretibus, recentissimis laxe usque subdense adpresse rufo-pilosulis, vetustioribus glabris et brunneis, deinde griseo-corticatis. *Folia* oblonga vel elliptico-oblonga, apicem versus sensim breviter attenuata, apice ipso obtusa, basi late in petiolum angustata et ± decurrentia, in sicco olivaceo-brunnea, subtus saepe pallidiora, rigide chartacea, utrinque subnitida, costa utrinque laxissime adpresse rufo-pilosula excepta glabra, margine plerumque manifeste subserrato-dentata (dentibus obtusis glandula terminatis 1 mm altis et 5—7 mm distantibus), interdum in superiore laminae parte paucidentata, rarissime subintegra, 7—14(—16) cm longa, 3.5—5.5(—6.5) cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 6—7 inter sese ± distincte curvato-conjunctis subtus parum prominentibus, venis venulisque utrinque sat dense reticulatis parum prominulis; petiolus initio pilosus, demum glabrescens, basi incrassatus, 3—6(—9) mm longus. *Racemi* axillares densiflori 7—10 cm longi, ad rhachidem et pedicellos sat dense breviter rufo-pilosi. *Rhachis* sub anthesi gracilis, c. 0.6 mm diam. *Bracteae* ovato-acutae, 1 mm longae. *Pedicelli* saepe bini et connati, 1.5—2 mm longi, graciles. *Perianthium* flavidum vel virescens, laxe rufo-pilosum, 7—8 mm longum. *Antherae* 1.2 mm longae. *Glandulae hypogynae* subquadratae, liberae, approximatae. *Ovarium* rufo-tomentosum, stylo gracili glabro. *Fructus* immaturus ellipsoideus, apiculatus, verruculosus, laxe rufo-pilosus, 8 mm longus, 6 mm diam.

NEW GUINEA. Papua. Western Distr., Lake Daviumbu, Middle Fly River: *Brass 7919* (A, *typus*; B), *7704*. Tarara, Wassi Kussa River: *Brass 8494, 8554.* Merauke Distr., Tamarike, 15 m: *Anta 229.*

31. H. ledermannii Diels, Bot. Jahrb. 54, 1916, 204.

Frutex 1—1.5 m, cortice griseo. *Ramuli* graciles, ad innovationes fusco-ferrugineo-holosericei. *Folia* lanceolato-ovata vel oblongo-ovata, apice 2—3 cm longe subcaudato-acuminata, ± falcata et subacuta, basi in petiolum attenuata vix decurrentia, firme chartacea, novella utrinque fusco-ferrugineo-holosericea, adulta in vivo dilute viridia, in sicco pallide olivaceo-virescentia, supra glabra et nitidula, subtus diutius per faciem sat dense, ad costam densius pilis longis sericeis fusco-ferrugineis obtecta, demum omnino glabrescentia, antice ± irregulariter remote pauciserrata (dentibus prorsus versis c. 1 mm altis et 3—8 mm distantibus), basin versus integra, 8—13 cm longa, 3.5—5 cm lata, costa supra leviter, subtus magis prominente, nervis lateralibus utroque latere 6—8 curvato-erectis, praeter marginem obscure anastomosantibus, utrinque parum elevatis, venis venulisque utrinque dense reticulatis et prominulis; petiolus sat gracilis, 1—2 cm longus, initio rufo-tomentosus, denique glabrescens. *Racemi* ex axillis foliorum delapsorum orti, fere usque ad basin densiflori, graciles, c. 5 cm longi, ubique tomento rufo-ferrugineo adpresso obtecti. *Rhachis* 0.5 mm diam. *Bracteae* anguste lanceolatae, 1—1.5 mm longae. *Pedicelli* sub anthesi 1.5 mm longi, plerumque bini et fere usque ad apicem connati. *Perianthium* in vivo dilute purpurascens, c. 6 mm longum, tubo vix 0.5 mm diam., limbo 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* crassae, pulvinares, minutae, liberae, approximatae. *Ovarium* dense rufo-pilosum, stylo gracili glabro. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Sepik Distr., Etappenberg, 850 m: *Ledermann 9128* (B, *typus*).

32. H. arguta Sleum., Bot. Jahrb. 70, 1939, 147.

Frutex c. 3.5 m altus, ramulis teretibus sat dense adpresse rufo-pilosis, mox glabratis. *Folia* elliptico-oblonga, apice ± abrupte fere 2 cm longe acuminata, acuta, basi in petiolum angustata, subcoriacea, supra in sicco atroviridia vel nigrescenti-brunnea, subtus pallidiora, supra lucida, subtus opaca, initio utrinque ad costam rufo-ferrugineo-pilosa, in facie glabra, demum omnino glabrata, margine ± regulariter subargute serrata (dentibus manifeste prorsus versis, glandula terminatis itaque obtusiusculis, 4—8 mm distantibus et c. 1.5 mm altis), 7—9 cm longa, 3.5—4 cm lata, costa supra parum, subtus manifestius prominente, nervis lateralibus utroque latere 6—7 arcuato-ascendentibus, parum inter sese conjunctis, utrinque parum, sed distincte prominentibus, venis venulisque supra laxius, subtus densius prominulo-reticulatis; petiolus c. 0.5 cm longus. *Racemi* ex axillis foliorum delapsorum orti, gracillimi, sat dense fusco-pilosi, 7—8.5 cm longi. *Rhachis* c. 0.6 mm diam. *Bracteae* ovato-acuminatae c. 1 mm longae. *Pedicelli* plerumque bini et usque ad medium connati, tenues, fusco-pilosi, 2 mm longi. *Perianthium* in vivo flavescens, c. 6 mm longum, laxe fusco-pilosum, vel antice ± glabrescens. *Antherae* 1.2 mm longae. *Glandulae hypogynae* subovato-oblongae, basi connatae. *Ovarium* ferrugineo-hirsutum, stylo glabro. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr., Boridi, c. 1200 m: *Carr 13436* (B, *typus*; BM, L, SING).

33. **H. serrata** (R. Br.) Bl., Ann. Sci. Nat. II, 1, 1834, 215; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 84; Meisn. in DC., Prodr. 14, 1856, 441; Miq., Fl. Ind. Bat. I, 1, 1858, 987; K. & V., Bijdr. Booms. Java 5, 1900, 314 incl. var. *subintegra* K. & V. l. c. 315, 317; Koord., Exk. Fl. Java 2, 1912, 154; Koord.-Schum., Syst. Verz. 1913, fam. 66, p. 3, incl. var. *subintegra* Koord. & Val. p. 4; Merr., Rumph. Herb. Amboin. 1917, 205; Koord., Fl. Tjib. 1923, 47 incl. var. *subintegra* K. & V.; Bak. f., J. Bot. 63, 1925, Suppl. 89; Heyne, Nutt. Pl. 1927, 588; Ochse & Bakh. v. d. Br., Ind. Groent. 1931, 621, fig. 380; Back., Bekn. Fl. Java em. ed. IV A, 1942, fam. 79, p. 4. — *H. serrata* (R. Br.) Bl. var. *petiolata* K. & V., Bull. Inst. Bot. Btzg 2, 1899, 10; Koord., Nat. Tijd. Ned. Ind. 60, 1901, 389. — *Roupala serrata* R. Br., Trans. Linn. Soc. 10, 1810, 192 (*Rhopala*); R. & S., Syst. Veg. 3, 1818, 429; Spreng., Syst. Veg. 1, 1825, 482; R. & S., Mant. 3, 1827, 285; R. Br., Prot. Nov. Holl. Suppl. 1830, 32; Roxb., Fl. Ind. ed. Carey 1, 1832, 365. — *H. curtisii* Gamble, Kew Bull. 1913, 116; J. As. Soc. Beng. 75, ii, 1914, 348; Ridl., Fl. Mal. Pen. 3, 1924, 142. — *H. scortechinii* Gamble, Kew Bull. 1913, 117; J. As. Soc. Beng. 75, ii, 1914, 348; Ridl., Fl. Mal. Pen. 3, 1924, 143. — *H. brachyantha* Merr., Pap. Mich. Acad. Sci. 24, 1939, 66.

Arbor vespertilionum Rumph., Herb. Amboin. 7, 1755, 17, excl. t. 10.

var. **serrata.**

Arbor 10—30 m alta, trunco 30—100 cm diam., cortice griseo minute fisso. *Ramuli* in partibus novellis ± dense rufo-ferrugineo-sericei, ceterum cito glabrescentes, teretes. *Folia* oblonga vel elliptico-oblonga, rarius lanceolato-oblonga, apice sat breviter acuminata, acutiuscula vel obtusa, rarius subrotundata, basi attenuata et in petiolum subalatum basi incrassatum decurrentia, subcoriacea, firma, supra glabra et lucidula, in vivo intense viridia, in sicco flavido- vel fusco-olivacea, subtus pallidiora, in vivo opaca, in sicco saepe brunnescentia, initio subtus per totam faciem ± dense pilis minutis adpressis puberula, postea ± glabrescentia, tarde omnino deglabrata, per totam marginem nunc aequaliter, nunc inaequaliter et distanter uncinato-serrata, rarius obsolete serrata vel integra (omnia in eadem arbore occurrunt), (10—)12—20(—22) cm longa, (4—)5—8.5(—12) cm lata, costa supra parum vel vix, subtus bene prominente, nervis lateralibus curvatis utroque latere 8—10 margine ± obsolete anastomosantibus supra fere planis, subtus prominulis, venis venulisque supra subinconspicuis, subtus laxe reticulatis et parum prominulis; petiolus (1—)1.5—2 cm longus, initio rufo-sericeus, serius glabrescens. *Racemi* et axillares et in axillis defoliatis, graciles, fere usque ad basin densiflori, 9—15 cm longi, ubique ± dense rufo-sericeo-tomentelli, rarius aetate glabrescentes. *Rhachis* c. 1 mm diam. *Bracteae* ovato-acuminatae, minutae. *Pedicelli* graciles, plerumque bini et fere usque ad medium connati, sub anthesi 2—3 (raro usque ad 4) mm longi. *Perianthium* in vivo albidum, demum flavescens, olore mellis nauseabundo, 7—8 (raro usque ad 10) mm longum, tubo vix 1 mm diam., limbo c. 1.5 mm diam. *Antherae* 1.5—2 mm longae. *Glandulae hypogynae* oblongae usque ovato-oblongae, apice truncatae, subcrassae, liberae et ± segregatae. *Ovarium* plerumque dense, raro laxe rufo-sericeum, stylo gracili glabro. *Fructus* ± late ellipsoideus, parum obliquus, utrinque breviter attenuatus, interdum basi distinctius contractus, apice obtusus vel apiculatus, laevis, in vivo sordide viridis, uno latere costa plerumque bene incrassata instructus, (2.5—)3—4(—5) cm longus, 1.5—2(—2.5) cm diam., pericarpio 1—2 mm crasso; pedicellus fructiferus 4—6 mm longus, 2 mm crassus.

SUMATRA. Eastcoast. Asahan, near Lumban Ria: *Rahmah 7655* (S; UC, *typus H. brachyanth.*, haud vidi), *7543, 7694, 8056, 7812.* Near Ack Munte, NE of Tomuan Dolok: *Rahmat Si Boeea 9289.* W. Coast. Pajacombo, Muaro Padang Si Baladung, 1300 m: *NIFS bb. 6608.*

MALAY PENINSULA. Penang. Penara Bukit, 450 m: *Curtis 3020* (K, *typus H. curtisii*; SING). Perak: *Scortechini 467b* (CAL, *holotypus H. scortech.*).

JAVA. Bantam. Nirmala, 1100 m: *Backer 11081*, a glabrescent form. Tjiringin: *Koorders 6252.* Genteng, Kosala, c. 800 m: *Forbes 508.* Batavia. G. Salak: *Koorders 24314, 24364, 33251.* Preanger. Takoka: *Koorders 6233, 6234, 6253, 11820, 12095, 15311, 25600, 25715, 32731, 32817, 37275, 39660.* Foot of Mt Gedeh: *Ridley.* Gedeh: *Junghuhn.* Pr. Tjampaka: *Zollinger 1482.* Puntjak, G. Limo, 1400 m: *v. Steenis 5611.* Tjibodas, 1400—1600 m: *Bruggeman 3434, Koorders 6237* (BO, *lecto-typus* var. *subintegr.*), *6238—42, 6255, 12596, 12616, 13007, 22216, 25924, 32177, 32187, 41765, 41824.* Bandung: *FRI Ja. 2383.* Pangentjongan: *Koorders 6250, 26556*; ibid., G. Galunggung: *Koorders 13973, 26537.* Tegal. G. Slamat, 1400 m: *Koorders 6268, 6269.* Kedu. G. Sendoro: *Koorders 11337.* Semarang. G. Telemojo: *Koorders 6263, 6264, 7659.* Madiun. Ngebel: *Koorders 6261, 29353, 29354.* Besuki. Tjuramanis: *Koorders 2103* (BO, *lecto-typus* var. *petiol.*), *20841, 21727, 21737, 21738.*

BORNEO. Br. N. Borneo. Kinabatangan: *Br. N.B. For. Dep. (SAN) A 4651.* Sandakan Distr.: *Br. N.B. For. Dep. 2529.* W. Borneo. Sungei Sambas: *Hallier 1051.* S. Borneo. Barito River: *Korthals.* SE. Borneo. W. Kutei, 800 m: *Endert 3211*; ibid., near Bikam Batu Beng, 80 m: *Endert 2255.* Peak of Balikpapan (G. Beratus), 700 m: *Kostermans 7597.* Karimata Isl.: *Teysmann 11388.*

MOLUCCAS. Ambon. Nusalaut: *Chr. Smith* (BM, *typus H. serrat.*). Loco indicato: *Zippelius* ("*Helittophyllum parviflorum*", L). — Not retraced on Ambon up to the present.

The description of the fruit has been based exclusively on materials from Java. No fruits from specimens collected in Ambon seem to exist up to now, which could affirm the identity of both the Javanese and Amboinese gatherings, which are very similar in the characters of the leaves and flowers. The description of the fruit by Rumphius is too vague ("Fructus

magnitudinem lansiorum obtinent, sed superius obtuso apice constant") to allow a safe conclusion.

The fruits of *Kostermans 7597* and *Teysmann 11388* from Borneo respectively Karimata Isl. differ from the Javanese ones remarkably, being depressed-ovoid, smaller in size (2.5—3 cm) and blue-black when fresh, the pericarp apparently thinner, whilst the leaf-characters are more or less the same as observed in the Javanese and Amboinese material. It is possible, that these fruits from Borneo in the future render to be identical with those occurring on Ambon, and the true *H. serrata* then becomes restricted to Borneo and Ambon, and possibly is found in Celebes. What here is regarded as *H. serrata* from the Malay Peninsula, Sumatra and Java then would have to be named *H. curtisii*, which indeed is a glabrescent form, but has the same fruit as the Javanese plant. *H. scortechinii*, published by Gamble together with *H. curtisii* has the flowers in a very early bud stage, but the ovary with its scattered hairs and the characters of the leaf indicate clearly its identity with the Javanese *H. serrata*.

33a. var. **oreophila** Sleum. var. nov.

Arbor parva 3—8 m alta, corona densa. Folia magis coriacea, integra vel subintegra, elliptica vel ovato-elliptica. Inflorescentiae saepius glabrescentes. Ovarium laxe pilosum, rarissime glabrum.

SUMATRA. W. Coast. Ophir Distr. NW. slope G. Talamau, 2100 m: *Bünnemeijer 915a.*

JAVA. Preanger. G. Papandajan W., 2100 m: *Doct. v. Leeuwen 13306* (BO, *typus)*, among alang-alang in scrubs, fr. juv. V-30; ibid., boven Tjileutleug, 2000 m: *v. Steenis 6777*, subalpine brushwood; ibid., Tegal Paku, 2100 m: *v. Steenis 6801*; ibid., G. Saroni, c. 2500 m: *v. Steenis 4125*; ibid., above Pondok, c. 2650 m: *c. Steenis 11668.* G. Galunggung, forest on summit, 2229 m: *Koorders 8061, 10259.* Kediri. Ngandjuk, Ngliman, 0220 m: *FRI Ja. 3596.* Madiun. G. Lawu, SE. slope, 2000—2300 m: *Elbert 282*; ibid., edge of rain-forest, 2300 m: *Dorgelo 2049, Coert 1000, 1035.*

34. H. excelsa (Roxb.) Bl., Ann. Sc. Nat. II, 1, 1834, 219; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 84 incl. var. α & β; Meisn. in DC., Prodr. 14, 1856, 441 incl. var. *edentata* Meisn. l. c.; Miq., Fl. Ind. Bat. I, 1, 1858, 987; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 191; Ridl., J. Str. Br. R. As. Soc. 33, 1900, 132; Agr. Bull. Str. and F. M. S. 1, 1902, 248; Lec., Not. Syst. 1, 1909, 191; Ridl., J. Str. Br. R. As. Soc. 59, 1911, 163; Lec., Fl. Gén. I. C. 5, 1914, 162, fig. 14(5); Gamble, J. As. Soc. Beng. 75, ii, 1914, 346 incl. var. *salicifolia* (Presl) Gamble, var. *forbesii* Gamble p. 347; Ridl., J. Fed. Mal. Stat. Mus. 10 (1920) 113; Merr., J. Str. Br. Roy. As. Soc. 85, 1922, 168; Parkins., Flor. Fl. Andam. Isl. 1923, 228; Ridl., Fl. Mal. Pen. 3, 1924, 143 incl. var.; Bak. f., J. Bot. 63, 1925, Suppl. 89; Burk. & Henders., Gard. Bull. Str. S. 3, 1925, 417; Burk., Dict. 1935, 1133; Kanj., Kanj., De & Das, Fl. Assam 4, 1940, 107; Suesseng. in Heine, Fedde Rep. 54, 1951, 226 pr. p: — *Roupala excelsa* Roxb., Hort. Beng. 1814, 83, nom. nud.; Fl. Ind. 1, 1820, 363 (*Rhopala*); l. c. ed. Carey 1, 1832, 365 (Wallich Cat. 1038); Spreng., Syst. Veg. 1, 1925, 482; R. & S., Mant. 3, 1827, 285; Wight, Ic. 1839, t. 190. — *H. salicifolia* Presl, Epim. 1851, 247; Walp., Ann. 3, 1852/53, 333; Meisn. in DC., Prodr. 14, 1856, 439; Miq., Fl. Ind. Bat. I, 1, 1858, 985; Kurz, For. Fl. Burma 2, 1877, 312. — *Alseodaphne crassipes* Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 146; Ridl., Fl. Mal. Pen. 3, 1924, 100, cf. Symington, Kew Bull. 1937, 319. — *H. oblanceolata* Merr., Pap. Mich. Acad. Sci. 24, 1939, 67.

Arbor mediocris vel alta, 15—28 m alta, trunco 30—50 cm diam. saepius torquato, cortice brunnescenti vel griseo, scabro, verruculoso. *Innovationes* vel ramuli recentissimi ferrugineo-tomentosi cito glabrati, hornotini iam glabri et cito brunneo- vel griseo-corticati. *Folia* ± anguste oblonga vel oblanceolata vel obovato-oblonga, apice breviter ± abrupte subacute vel obtuse acuminata, basi in petiolum cuneata paulloque decurrentia, plerumque suboriaceea usque chartacea, rarius coriacea, novella utrinque ferrugineo-velutina, maturitate citissime glabrescentia et omnino glabra, in vivo laete viridia, in sicco flavido-viridia, supra plerumque manifeste, subtus minus distincte nitida, integra vel antice sat grosse et obtuse pauciserrata, (8—) 10—15 (raro usque ad 24) cm longa, (3—)3.5—5 (raro usque ad 8) cm lata, costa supra parum, subtus manifestius prominente, nervis lateralibus utroque latere (6—)7—8 (interdum usque ad 10) in inferiore parte rectiusculis, marginem versus curvatis et inter sese conjunctis, supra subtusque parum prominentibus, venis venulisque utrinque rete laetum sat densum et bene prominulum formantibus; petiolus glaber, 0.6—1(—1.5) cm longus. *Racemi* ex axillis summis orti, interdum subterminales, solitarii vel 2—3, sat graciles, erecti, fere ad basin densiflori, plerumque (certe initio) ± dense ferrugineo-tomentosi, interdum ± glabrescentes, rarius fere glabri, (5—)7—12(—15) cm longi. *Rhachis* 1—1.5 mm diam. *Bracteae* ovato-lanceolatae, sat tenues, 2—3 mm longae, saepius pedicellos longit. aequantes, sicut bracteolae minutae ± persistentes. *Pedicelli* subgraciles, sub plena anthesi 2—3 (rarius usque ad 4) mm longi, saepius gemini, subliberi vel plerumque usque ad medium connati. *Perianthium* gracile, in vivo flavovirens, fragrans, ± dense ferrugineo-pilosum usque -tomentosum, rarius ± glabrescens, sed certe passim pilosulum, (6—)7—8 mm longum, tubo 0.5 mm diam., limbo 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* subrotundatae liberae. *Ovarium* rufescenti-villosum, stylo gracili glabro. *Fructus* ellipsoideus vel oblique ovoideus, obtusus, laevis, glaber, caeruleo-nigrescens, 1—1.2(—1.5) cm longus, 0.8—1.2 cm diam., pedicello 7—8 mm longo, pericarpio 0.8—1 mm crasso.

INDIA. E. Bengal. Chittagong: *Roxburgh* (BM, *typus H. excels.*); ibid.: *Hooker f. & Thomson, Kunstler 32, 221, 245, 267, 269, 400, 612, Cowan 2268, 2391.* Calcutta: *Helfer 50, 99, 224.* Assam. Khasia, 900—1500 m: *Hooker f. & Thomson.* N. C. Hills, c. 1500 m, cit. Kanjilal etc. p. 107.

BURMA. Lower Burma. Insein Distr.: *Khant 66.* Martaban coast: *Wallich 1038* (B, BM, K; NY, *typus fragm. H. excels.* var. *edentat.*). Mergui: *Griffith.* Tenasserim: *Helfer 4366* (B; PR, *typus H. salicifol.*, haud vidi), *Packman.* Tavoy, Tenasserim circle: *Manson 31.*

ANDAMANS. Port Blair: *Kunstler 82, 479.* Mt. Harriett: *Kunstler.* Hopetown: *Parkinson 818.* Bumlitan: *Kunstler.*

NICOBARS. Car; *Kunstler.*

INDOCHINA. Cambodge. Phnom Penh, Lout Chom: *Béjaud 839*, Sélamphao: *Harmand 184 pr. p.* Cochinchina. Ile Phu-quoc: *Pierre 1441.* Mts Dinh, près Baria: *Pierre 2855.* Laos. Mékong à Ouban: *Thorel 2793.* Bassin du Sémoun: *Harmand 184 pr. p.*

SIAM. Chantaburi, Krat: *Kerr 17911.* Mamo Namchok: *For. Dep. F. M. S. 3762.* Surat, Chumpawn: *Kerr 16231.* Puket, Trang: *Vanpruk 815*; Satul: *Ridley 15105.* W. coast and Isl., Mamoh: *B. Kloss 6719.*

MALAY PENINSULA. Kedah. P. Langkawi: *Batten Pooll K 2.* S. Batu: *Ridley 15537.* S. Lugong: *Kiah SF 35088.* For. Res. Padang Terop: *Wyatt-Smith KEP 71158.* Perak. Goping: *Kunstler 691, 5928, 6096, 6100, 10836.* Simpang: *Wray 2310*, cit. Gamble, haud vidi. G. Haram Parah: *Scortechini 687*, cit. Gamble, haud vidi. Larut:

Kunstler 3392. Selangor. S. Buloh Res.: *For. Dep. F.M.S. 13920.* Malacca: *Maingay 1261* (K, *typus Alsod. crassip.*), *Maingay Kew Distr. 1310 (3138).* S. Udang: *Derry 456, 530, 1202, Goodenough 1388, 1760.* Singapore: *Ridley 6428, Goodenough 2759, Sinclair SF 40049*; ibid., Bukit Timah: *Langlassé 196.*

SUMATRA. Tapanuli. Lumban Lobu, Toba: *Rahmat Si Boeea 9798* (A, *typus H. oblanceol.*). W. Coast. Sawahlunto: *Bosscha.* E. Coast. Bandar baru, 1100 m: *Lörzing 4606.* Palembang. S. Muara Mengkulem, 150 m: *Forbes 3097a* (A; BM, *typus H. excels.* var. *forbesii* (*"3047a, 3079a"*); FI, L, P). Banjuasin, 15—20 m: *Thorenaar P 86, Grashoff 718, 912.* Lampung. Talangbatu, 30 m: *Idenburg 45.* Simalur: *Achmad 936, 962, 1090, 1192, 1555.* Riouw. Tandjungpinang: *Teysmann.* Banka: *Teysmann.* Billiton: *Teysmann.*

BORNEO. Br. N. Borneo. Mt Kinabalu, Gurulau ridge, 1000 m: *J. & M. Clemens 50759*; ibid., Tenompok, c. 1500 m: *J. & M. Clemens 26172, 28130, 28292, Carr SF 27885.* Sandakan: *Ramos 1653, Br. N.B. For. Dep. 10345.* Bettotan: *B. Kloss SF 18979, Br. N.B. For. Dep. 4586.* Tawao: *Elmer 21346.* Sarawak. Marop: *Beccari 3216.* C. & SE. Borneo: *Teysmann 11530.* G. Kenepai: *Hallier 1677.* G. Klam: *Hallier 2385.* W. Kutei: *NIFS bb. 15623.* Sampit: *NIFS bb. 7917.*

35. **H. peltata** White, J. Arn. Arb. 10, 1929, 210.

Arbor 18—24 m, cortice dilute brunneo. *Ramuli* saturate rufo-tomentosi. *Folia* ovata vel elliptico-ovata vel elliptica, 1 cm supra basin rotundatam peltata, apice late obtuse et c. 1—2 cm longe acuminata, ± coriacea, in sicco intense olivacea usque nigrescenti-brunnea, novella utrinque ± dense rufo-pilosa vel -tomentosa, matura supra costa nervisque pubescentibus exceptis glabra et nitentia, subtus imprimis ad costam et nervos dense rufo-pilosa usque -tomentosa, integra vel undulata, (10—)12—24(—34) cm longa, 6—12(—17) cm lata, costa utrinque prominente, nervis lateralibus utroque latere 12—18, subrectis, interque sese ± parallelis, prope marginem curvatis et parum distincte conjunctis, supra fere planis, subtus prominentibus, venis laxe reticulatis subtus tantum prominulis, venulis subinconspicuis; petiolus rufo-tomentosus, 3—4 cm longus, c. 3 mm crassus. *Racemi* e ligno vetere prodeuntes, densiflori, 12—22 cm longi, ad rhachidem 2 mm crassam et ad pedicellos rufo-tomentosi. *Bracteae* ovato-acutae, minutae. *Pedicelli* crassiusculi, gemini, liberi vel usque ad medium connati, 3—5 mm longi. *Perianthium* in vivo flavescens, 2.5 cm longum, subdense rufo-pilosum, basi inflatum (2.5 mm diam.), in tubo medio 1 mm tantum diam., limbo dilatato 2.5 mm diam. *Antherae* 3 mm longae. *Glandulae hypogynae* carnosae, truncatae, 1 mm altae, liberae, approximatae itaque cupulam aemulantes. *Ovarium* ovoideum, glabrum, stylo gracili. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr., Bisiatabu, 450 m: *Brass 574* (A, B; BRI, *typus*; K; P).

36. **H. cameronii** F. v. M., Trans. Roy. Soc. Vict. N. S. I, 2, 1889, 7; Lauterb., Bot. Jahrb. 50, 1913, 330, fig. 1.

Arbuscula, ut videtur. *Ramuli* novelli pilis crispulis ferrugineis demum griseis tomentosi, in partibus florigeris iam glabrati. *Folia* elliptica vel oblongo-ellptica, apice breviter subobtuse acuminata, basi cuneata, subsesilia vel usque ad 2 mm petiolata, juniora utrinque imprimis subtus ad costam adpresse rufo-pilosa, cito omnino glabra, subcoriacea, in sicco olivaceo-flavescentia, opaca, integra vel hic inde breviter dentata, subcoriacea, margine paullo recurvata, 1.8—2.4 cm longa, 0.8—1.2 cm lata, costa supra leviter impressa, subtus prominente, nervis lateralibus utroque latere c. 5 inferne subrectis, marginem versus curvato-conjunctis, supra levissime immersis, subtus prominulis, venis venulisque parum conspicuis. *Racemi* solitarii e ramulis defoliatis orti, 5—6.5 cm longi, fere usque ad basin densiflori. *Rhachis* sicut pedicelli laxe usque laxissime adpresse rufescenti-pilosa, c. 1.5 mm diam. *Bracteae* lanceolatae minutissimae, caducae. *Pedicelli* crassiusculi plerumque bini, basi connati, 4—6 mm longi. *Perianthium* c. 3 mm longum, pilis solitariis ad basin obviis exceptis glabrum, tubo c. 0.7 mm dam., limbo sensim clavato 4 mm longo, 1.8 mm diam. *Antherae* c. 4 mm longae. *Glandulae hypogynae* ovatae, liberae, approximatae, vel basi tantum connatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr., Mt Knutsford: *McGregor* anno 1889 (B, K; MEL, *typus*).

37 H. microphylla Diels Bot. Jahrb. 54, 1916, 201.

Arbor vel arbuscula, dense ramosa. *Ramuli* novelli ferrugineo-tomentosi, vetustiores teretiusculi, glabrescentes. *Folia* ovata usque oblongo-ovata, apice breviter obtuse acuminata, basi attenuata, coriacea, novella utrinque ferrugineo-tomentosa, citissime glabrescentia, juniora subtus tantum dense pilis crispulis obsita, adulta utrinque glabra, in sicco dilute brunnescentia, supra nitentia, subtus opaca, integra, 1.5—3 cm longa, 1—1.6 cm lata, costa supra per totam longitudinem leviter impressa, subtus prominente, nervis lateralibus utroque latere 4—5(—6) a costa angulo subrecto abeuntibus, rectiusculis, marginem versus inter sese curvato-conjunctis, cum venis venulisque dense reticulatis supra parum sed distincte impressis, subtus prominulis; petiolus gracilis, diutius tomentellus demum glabrescens, 3—5(—7) mm longus. *Racemi* axillares solitarii, stricti, subgraciles fere usque ad basin ± densiflori, 4—7 cm longi, ubique ferrugineo-tomentosi. *Rhachis* 1 mm diam. *Bracteae* ovato-acuminatae, vix 1 mm longae, pilis crispulis fere occultae. *Pedicelli* graciles, plerumque bini, basi paullo connati, 4—5 mm longi. *Perianthium* in vivo flavum, c. 14—17 mm longum, tubo 1 mm diam., limbo clavato 1.5 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* ovatae, tenues, apice manifeste longeque rufo-pilosae vel -ciliatae, approximatae, marginibus sese tegentes. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Madang Distr., Bismarck Mts, 2400 m: *Schlechter 18715* (B, *typus*; P).

38. H. elephanti Sleum. sp. nov.

Arbor 4—5 m, glaberrima, cortice tenui brunneo. *Ramuli* petiolis decurrentibus breviter alati, subquadrangulares. *Folia* lanceolata, apice late attenuata vel subacuminata, subacuta vel obtusa, interdum rotundata, glandula instructa, basi late cuneata et in petiolum brevissimum decurrentia, valde coriacea, in sicco supra sordide olivaceo- vel flavido-atrescentia, nitida, subtus brunnea et opaca, integra, 9—20 cm longa, (2—)2.5—4 cm lata, costa valida utrinque valde prominente, nervis lateralibus utroque latere 7—12 rectiusculis, praeter marginem arcte curvato-conjunctis et quasi in nervum intramarginalem collectis, supra parum vel vix elevatis, subtus distinctioribus, venis utrinque parum prominulis laxeque reticulatis, venulis subobscuris; petiolus 2—3 mm longus et crassus, rugosulus. *Racemi* axillares laxiflori, 14—20 cm longi, omnino glabri. *Rhachis* varie angulata 2 mm diam. *Bracteae* deltoideae acutae vix 1 mm longae. *Pedicelli* crassiusculi, 6—7 mm longi, plerumque bini, in $^1/_3$ long. connati. *Perianthium* haud visum. *Glandulae hypogynae* ovatae, truncatae, liberae, approximatae, primo cupulam aemulantes, demum divergentes. *Ovarium* glabrum, anguste ovoideum, basi attenuatum, stylo c. 19 mm longo. *Fructus* ignotus.

INDOCHINA. Cambodge. Mont de l'Eléphant, 1000 m, sol argileux: *Poilane 321* (P, *typus*), defl. 11-VIII-19; ibid., nouvelle route à la Cascade, 800 m: *Poilane 23166*, forêt, fr. juv. 5-XII-33.

39. **H. pterygota** Sleum. sp. nov. — *H. erratica* (non Hook. f.) Stapf, Trans. Linn. Soc. Bot. 4, 1894, 220; Merr., En. Born. Pl. 1921, 235.

Frutex 1.5—2 m, vel arbor parva 3—7 m alta, glabra. *Ramuli* graciles dilute brunnei. *Folia* lanceolata vel oblongo-lanceolata, apice acute acuminata, basi in petiolum acute attenuata et paullo decurrentia, chartacea usque subcoricea, in sicco olivaceo-viridia vel pallide flavescenti-viridia, glabra, supra subtusque nitidula, integra vel plerumque antice pauceserrata (dentibus subsinuatis prorsus versis glandula terminali obtusatis 1—2 m altis, plerumque valde remotis), (7—)8—11(—14, rarissime usque ad 17) cm longa, 2—3.5(—5) cm lata, costa supra parum, subtus valde prominente, nervis lateralibus utroque latere 8—9 inferne saepius rectiusculis, superne curvatis et ± distincte inter sese anastomosantibus, utrinque parum prominentibus, venis venulisque sat dense reticulatis utrinque prominulis; petiolus gracilis, 1—1.5 cm longus, basi parum incrassatus. *Racemi* axillares vel subterminales, graciles, fere usque ad basin sat laxiflori, 7—12 cm longi, omnino glabri. *Rhachis* angulata 0.5—1 mm diam. *Bracteae* ovato-acuminatae, acutae, membranaceae, viridescentes, c. 1 mm longae. *Pedicelli* subgraciles, in utroque latere manifeste viridescenti-membranaceo-alati, plerumque bini et $^1/_3$—$^1/_2$ long. connati, sub anthesi 4—5(—6) mm longi. *Perianthium* in vivo flavido-albescens vel pallide flavescenti-virescens, interdum colore lavandulae tinctum vel citrinum, gracillimum, 11—12 mm longum, tubo 0.4—0.5 mm diam., limbo elongato-ellipsoideo subacuto 1 mm diam. *Antherae* 1.6 mm longae. *Glandulae hypogynae* ovato-oblongae, truncatae, ± retusae, liberae, approximatae. *Ovarium* glabrum, stylo filiformi. *Fructus* adhuc incognitus.

BORNEO. Br. N. Borneo. Mt Kinabalu, Tenompok jungle, c. 1500 m: *J. & M. Clemens 28070* (A, BM, BO, K; L, *typus*; NY), fl. 27-I-32, 29874. Tenompok ridge, c. 1200 m: *J. & M. Clemens 27536*. Tenompok-Dallas path, c. 1280 m: *Carr SF 27146*. Dallas, c. 900 m: *J. & M. Clemens 30080*. Upper Kinunut valley, c. 1200 m: *Carr SF 27155*. Penataran River basin, c. 1200 m: *J. & M. Clemens 32607*. Mt Nunkok, 900—1200 m: *J. & M. Clemens 32711, 35111*. Above Kinataki River: *J. & M. Clemens 50417*. Mt Kinabalu, loco speciali haud ind.: *Haviland 1197* ("*H. erratica*" ap. Stapf), *Haslam*.

40. **H. shweliensis** W. W. Smith, Not. Bot. Gard. Edinb. 10, 1918, 180.

Frutex vel arbor parva 5—10 m alta. *Ramuli* novelli laxissime adpresse rufescenti-pilosuli, mox omnino glabrescentes, in sicco flavido-viridescentes, vetustiores subteretes nigricantes. *Folia* obovato-oblonga vel oblonga rarius oblanceolata, apice breviter sat abrupte acuminata, acutiuscula, basi in petiolum attenuata, in superiore petioli parte decurrentia, novella papyracea, matura chartacea usque subcoriacea, in sicco flavido-virescentia, utrinque ± opaca, glaberrima, sat regulariter et praesertim antice serrata (dentibus prorsus versis, glandula crassiuscula terminatis, 0.5 mm altis, 4—8(—10) mm distantibus), (6—)7—10(—13) cm longa, 2.5—3.5(—4, rarius usque ad 5) cm lata, costa supra parum, subtus manifeste prominente, nervis lateralibus utroque latere 6—8 inferne rectiusculis vel leviter curvatis, inter sese ± parallelis, ante marginem distinctius curvatis et anastomosantibus, nervis aliis intercalaribus brevioribus intermixtis, omnibus utrinque parum eminentibus, venis venulisque supra subobscuris vel in foliis maturis levissime impressis, subtus sat dense reticulatis minuteque elevatis; petiolus 2—5(—7) mm longus, paullo applanatus, basi incrassatus et rugulosus. *Racemi* axillares vel plerumque ex axillis defoliatis orti, undique floriferi, ascendentes, 8—12 cm longi. *Rhachis* parum angulata, ad basin infimam rufo-tomentosula ceterum sicut pedicelli glabra, ± 2 mm diam. *Bracteae* conspicuae, foliaceae, lanceolatae usque lanceolato-oblongae, ± obtusae, glabrae, virides, ad flores inferiores maiores, versus flores superiores decrescentes, 5—10 (rarius usque ad 20) mm longae, 1.5—3 (rarius usque ad 5) mm latae, acutiusculae, demum caducae; bracteolae lanceolatae 2 mm longae, 0.5 mm latae. *Pedicelli* 3—4 mm longi, crassiusculi. *Perianthium* 11—13 mm longum, in vivo viridi-aurantiacum vel flavidum, fragrans, glabrum, tubo 0.8 mm diam., limbo breviter clavato c. 3 mm longo, 1.5 mm diam. *Antherae* c. 3 mm longae. *Glandulae hypogynae* rotundae, liberae. *Ovarium* glabrum. *Fructus* juvenilis obovoideus vel subglobosus, verruculosus, sulcatus.

China. Yunnan. Shweli (Lung Chiang) valley, lat. 25° N, c. 1800 m: *Forrest 7852* (A; E, *typus*; K); ibid., c. 2100 m: *Forrest 9455.* Between Shweli and Tengyueh valleys, c. 2130 m: *Forrest 8766.* Shweli-Salween divide, 25° 30′: *Forrest 17639*; ibid., 25° 40′—98° 40′: *Forrest 24354.* Mid. W. Yunnan: *Forrest 26107.*

41. H. microcarpa Sleum. sp. nov.

Arbor parva, ramulis subteretibus sat gracilibus, novellis saturate rufo-tomentosis, vetustioribus glabrescentibus demum cinerascentibus. *Folia* elliptica, apice late breviter subabrupte acuminata, subacuminata vel obtusiuscula, basi late attenuata usque subrotundata, paullo inaequilateralia, subcoriacea vel rigide chartacea, in sicco virescenti-flavescentia, supra subtusque opaca, matura supra glabra, subtus in facie passim, ad costam et nervos densius pilis ± crispulis rufo-ferrugineis induta, integra, 4—6.5 cm longa, 2—3 cm lata, costa supra fere plana, subtus valde prominente, nervis lateralibus utroque latere c. 6 subarcuatis ante marginem curvato-conjunctis supra fere obscuris, subtus prominulis, venis venulisque supra inconspicuis vel levissime impressis, subtus dense prominulo-reticulatis; petiolus sat gracilis, 7—10 mm longus, diutius rufo-tomentosus. *Racemi* ex axillis summis orti, solitarii, ascendentes, rigidiusculi, pedunculo 1—2 cm longo incl. 7—11 cm longi, ubique pilis densissimis ± patentibus saturate ferrugineis tomentosi. *Rhachis* 1—1.5 mm diam. *Bracteae* lanceolatae c. 1.5 mm longae. *Pedicelli* crassiusculi, plerumque bini, basi vel usque ad medium connati, sub anthesi 3 mm longi. *Perianthium* in vivo brunnescens, nondum plane evolutum 11 mm, sub anthesi probabiliter c. 18 mm longum, tubo 0.8 mm diam., limbo clavato 1.5 mm diam. *Antherae* 1.7 mm longae. *Glandulae hypogynae* ovato-oblongae, liberae, distantes. *Ovarium* glabrum. *Fructus* nondum maturus subgloboso-ellipsoideus, stylo 18—19 mm longo gracillimo coronatus.

New Guinea. Papua. West. Highl., Waghi-Jimmi div.; *Womersley 5319* (K; L, *typus*; LAE).

42. H. grandis Hemsl., Hook. Ic. Pl. 27, 1900, t. 2631.

Frutex vel arbor parva, 3—8 m alta, trunco usque ad 20 cm diam. *Ramuli* crassi teretes, diutius tomento rufo velutini, tarde glabrati, brunnescenti-cinerascenti-corticati, longitudinaliter striati. *Folia* ampla, ad apices ramulorum conferta, saepius subopposita, oblanceolata vel oblongo-obovata, apice breviter acuminata, ± acuta, basin versus longe cuneata, basi ipsa rotundato-obtusa, subsessilia vel pro rat. longit. laminae brevissime petiolata, subcoriacea, in sicco supra atrescenti-viridia, subnitida, subtus brunnea et opaca, dense ± irregulariter serrata (dentibus glandula terminatis argutis prorsus versis 1—2, rarius usque ad 8 mm distantibus), initio ± dense longe adpresse pilosa, maturitate costa diutius tomentosa excepta glabrescentia, demum omnino glabra, subtus ad costam et nervos dense, per faciem laxe persistenter atrescenti-rufo-tomentosa vel -tomentosula, (16—)20—30(—35) cm longa, (5—)6—10(—12) cm lata, supra medium latissima, costa crassa utrinque elevata, nervis lateralibus numerosis (20 vel pluribus) a costa rectiuscule abeuntibus interque sese ± parallelis, marginem versus curvatis et obsolete anastomosantibus, aliis brevioribus intermixtis pluribus, omnibus supra parum, subtus manifeste prominentibus, venis venulisque utrinque aequaliter dense prominulo-reticulatis. *Racemi* e nodis defoliatis solitarii, pedunculo c. 2 cm longo incl. 20—30 cm longi, densiflori, ascendentes, ubique pilis ± patentibus densissimis rufo-tomentosi. *Rhachis* 2.5—3.5 mm crassa. *Bracteae* anguste ovato-acuminatae, fere subulatae, 2 mm longae. *Pedicelli* plerumque bini, sub plena anthesi 3—4 mm longi, basi tantum connati. *Perianthium* in vivo dilute brunneum vel rubescens, bene evolutum 22—26 mm longum, tubo gracili in medio 0.7 mm diam., limbo ellipsoideo acutiusculo 2 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* crenulatae, in cupulam connatae. *Ovarium* glabrum. *Fructus* in vivo purpurascenti-vividis, subglobosus vel lateraliter compressus, glaber, tarde dehiscens, usque ad 5 cm diam., saepius monospermus.

CHINA. Yunnan. Mts to the SW of Mengtze, c. 1500 m: *Henry 10704* (A; K, *typus*; NY). Ping Pien Hsien, 1350 m: *Tsai 55092, 55309, 62264.* Ma Kwan Hsien, 1800 m: *Tsai 51914.* Tsing-pian, 1800 m: *Tsai 52441.*

INDOCHINA. Tonkin. Entre Tsinh Ho et Chinh Nua, prov. de Lai Chau, 1200—1300 m: *Poilane 25694.*

43. H. maxwelliana Gibbs. J. Linn. Soc. Bot. 42, 1914, 131; Merr., En. Born. Pl. 1921, 235.

Arbor parva c. 3 m alta. *Ramuli* crassiusculi, novelli subangulati laxeque pilis minutis adpressis rufescentibus adspersi, annotini teretes glabri, in sicco saturate brunnei, demum griseo-corticati, cortice fissuris longitudinalibus numerosissimis instructo. *Folia* late elliptico- vel obovato-oblonga, apice late attenuata, valde obtusa usque rotundata, glandula crassa in sicco nigrescenti terminata, basi rotundata vel plerumque cordata fere auriculata, subsessilia, crasse coriacea, in sicco olivacea usque intense castanea, supra ± nitida, subtus opaca, integra vel hic inde denticulo brevissimo glanduloso crasso obsita, glabra, 15—23 cm longa, (7—)8—11 cm lata, margine parum revoluta, costa supra parum elevata, subtus maxime incrassata, nervis lateralibus utroque latere (8—)9—10 rectiusculis, marginem versus bipartitis vel in venas dissolutis interque sese curvato-conjunctis, aliis brevioribus vel minus distinctis a costa irregulariter abeuntibus intermixtis, omnibus utrinque laete prominentibus, venis venulisque sat densis prominulo-reticulatis; petiolus basi c. 4 mm crassus, 3—5 mm longus, rugosulus. *Racemi* axillares vel e ramis vetustioribus orti, vel caulini, solitarii, c. 10—14 cm longi, in rhachide et pedicellis sat dense, in perianthiis laxe adpresse rufescenti-pilosi, densiflori. *Rhachis* teres, c. 2 mm diam. *Bracteae* ovato-acuminatae, 1—1.5 mm longae, pilosae. *Pedicelli* crassiusculi 3—4(—5) mm longi, plerumque bini vel quaterni, liberi vel basi tantum connati. *Perianthium* in vivo albidum, fragrans, c. 12—13 mm longum, tubo 0.5—0.6 mm diam., limbo clavato 1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* ovatae, basi connatae. *Ovarium* glabrum. *Fructus* immaturus oblique subglobosus, basi vix contractus.

BORNEO. Br. N. Borneo. Mt Kinabalu, Marai Parai spur, 1500—1800 m: *Gibbs 3137* (BM, *typus*); ibid.: *J. & M. Clemens 11082, 31898.*

A sterile specimen, very similar in leaf-characters, perhaps conspecific:
MALAY PENINSULA. Trengganu. G. Padang S, c. 1200 m: *Moysey & Kiah SF 33362.*

44. H. olivacea Sleum., Bot. Jahrb. 70, 1939, 136.

Arbor gracilis c. 16 m alta. *Ramuli* graciles, juniores rubescenti-brunnei, glabri, vetustiores griseo-corticati. *Folia* oblonga, apice c. 1 mm longe acuminata, obtusa, basi in petiolum attenuata et ± decurrentia, paullo inaequilateralia, chartacea usque subcoriacea, in sicco supra olivaceo-viridia, subtus brunnescentia, utrinque opaca, glabra, integra vel valde remote subdenticulata, 11—14 cm longa, 4—5.5 cm lata, costa utrinque sat distincte prominente, nervis lateralibus utroque latere 8—10(—12) inferne rectiusculis et inter sese ± parallelis, ante marginem demum curvato-conjunctis, aliis intercalaribus brevioribus pluribus, omnibus utrinque parum, sed visibiliter prominulis, venis venulisque utrinque subdense prominulo-reticulatis; petiolus 3—5 mm longus, basi incrassatus et rugosus. *Racemi* ex axillis superioribus defoliatis orti, densiflori, c. 11 cm longi, ad rhachidem et pedicellos laxe, ad perianthia laxissime adpresse fusco-pilosi. *Rhachis* subgracilis, c. 1 mm diam. *Bracteae* ovato-acutae, minutae. *Pedicelli* 1.5—2 mm longi, plerumque bini basique connati. *Perianthium* in vivo flavescens, 5(—6) mm longum, tubo 0.4 mm diam., limbo late ellipsoideo 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* late oblongae, retusae, liberae vel ad basin tantum connatae. *Ovarium* glabrum. *Fructus* ellipsoideus vel subglobosus, c. 3.5 cm longus, laevis, in sicco castaneus, punctis pallidioribus laxe adspersus, pericarpio subduro 4 mm crasso.

NEW GUINEA. NE. New Guinea. Morobe Distr., Quembung Mission (Sattelberg), c. 600 m: *Clemens* (B, *typus*).

45. H. commutata Sleum., Bot. Jahrb. 70, 1939, 137.

Arbor, ut videtur, parva. *Ramuli* teretes glabri, rubescenti-brunnei, laxe lenticellis rotundis pallidioribus instructi. *Folia* lanceolato-oblonga, apicem versus sensim longe angustata, ± acuta, basi breviter in petiolum cuneata et decurrentia, chartacea, in sicco brunnea, subnitida, integra vel obscure valde remote denticulata, glabra, 15—22 cm longa, 4—6 cm lata, costa utrinque prominente, nervis lateralibus utroque latere 16—20 rectiusculis et inter sese subparallelis ante marginem ± distincte curvato-conjunctis, aliis brevioribus pluribus intermixtis, omnibus utrinque prominulis, venis venulisque utrinque dense reticulatis minuteque sed bene visibiliter prominulis; petiolus c. 1 cm longus, incrassatus, ad 3—5 mm supra basin haud alatus. *Racemi* ex axillis summis orti, graciles, rectiusculi, subdensiflori, 9—15 cm longi. *Rhachis* subteres, c. 1 mm diam., sicut pedicelli glabra vel sparse pilis adpressis fuscis induta. *Bracteae* minutae, cito caducae. *Pedicelli* graciles, plerumque bini et basi connati, 2(—3) mm longi. *Perianthium* gracile, glabrum, c. 9 mm longum, tubo 0.5 mm diam., limbo elongato-ellipsoideo c. 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* subquadratae, liberae vel basi connatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Madang Distr., West. Highlands, Bismarck Mts, c. 1100 m: *Schlechter 18547* (B, *typus*; P).

Similar, perhaps conspecific:

NEW GUINEA. NE. New Guinea. Morobe Distr., Sattelberg-Junzaing, 800—1500 m: *Mayr 757* (B, †).

46. H. odorata Diels, Bot. Jahrb. 54, 1916, 201.

Arbor 5—15(—20) m alta, trunco fusco-corticato. *Ramuli* subteretes, in sicco brunnei, omnino glabri, in partibus vetustioribus cortice nigrescenti transverse et longitudinaliter fisso obtecti. *Folia* obovato-elliptica rarius obovata, apice breviter sat abrupte obtuseque acuminata, basi in petiolum attenuata plerumque fere ad petioli basin decurrentia, subcoriacea, in sicco supra saturate cinerascenti-brunnescentia, nitentia, subtus brunnea pallidiora, novella laxissime adpresse pilosula, cito omnino glabra, integra, (4—)5—8 cm longa, (2—)2.5—3.5 cm lata, costa supra subtusque aequaliter prominente, nervis lateralibus utroque latere 4—5(—6) inferne rectiusculis, superne curvatis obscureque anastomosantibus, supra minute vel haud, subtus parum elevatis, venis venulisque utrinque densissime subtiliter prominulo-reticulatis, vel subtus manifestioribus; petiolus pro parte vel omnino fere alatus, 0.5—1 (rarius usque ad 1.5) cm longus, basi incrassatus. *Racemi* axillares sat densiflori, graciles, ascendentes, 6—10 cm longi. *Rhachis* teretiuscula, c. 1—1.2 mm diam., laxissime pilis rufescentibus adpressis obsita, vel glabra. *Bracteae* ovato-lanceolatae vel setaceae, ± 0.5 mm longae, subpersistentes. *Pedicelli* plerumque bini, basi connati, (3—)4—5 mm longi, graciles, glabri. *Perianthium* in vivo albidum, odoratum, c. 12 mm longum, glabrum, tubo 0.5 mm diam., limbo ellipsoideo 2 mm longo, c. 1.5 mm diam. *Antherae* fere 2 mm longae. *Glandulae hypogynae* liberae, ± approximatae. *Ovarium* glabrum. *Fructus* (*Brass 10768*) obovoideus, basi leviter attenuatus, c. 5 cm longus, 4—4.5 cm diam., pericarpio coriaceo c. 4 mm crasso extus lenticellato-pustulato, semen unicum magnum continens, pedicello c. 1 cm longo, 3—4 mm crasso.

NEW GUINEA. NE. New Guinea. Sepik Distr., "Hunsteinspitze", 1300—1350 m: *Ledermann 10954* (B, *typus*), *11211* (B, †), *11474* (B, †). W. New Guinea. Wissel Lake region, Enarotali, 1750 m: *Eyma 4946*; ibid., 1800 m: *Bw. 3102 Versteegh.* 9 km NE of Lake Habbema, 2800 m: *Brass 10768.*

47. H. teysmanniana Sleum. sp. nov.

Arbor, ut videtur, parva. *Ramuli* subteretes glabri, in sicco brunnei, in partibus vetustioribus cito griseo-corticati lenticellisque lanceolatis laxe instructi. *Folia* obovata vel plerumque oblongo-obovata, apicem versus sensim attenuata, apice ipso obtusa et subtus glandula terminali obsita, basin versus in petiolum cuneata et fere usque ad petioli basin decurrentia, subcoriacea, in sicco flavido-brunnescentia, utrinque sublucida, glaberrima, integra, 4—7 cm longa, (2—)2.5—3(—3.5) cm lata, costa in sicco rubescente, supra parum, subtus bene prominente, nervis lateralibus utroque latere 4—5 inferne rectiusculis antice curvatis et inter sese ± distincte anastomosantibus, supra parum, subtus manifeste prominentibus, venis venulisque supra plerumque parum visibilibus (rarius prominulis), subtus semper dense reticulatis et prominulis; petiolus subincrassatus 0.5—1 cm longus, saepe fere usque ad basin alatus, glaber, basi ipsa incrassatus ibique cito corticatus. *Racemi* axillares, erecti, subdensiflori, 6—14 cm longi. *Rhachis* angulata, in sicco dilute brunnea, in inferiore parte laxe breviter adpresse rufescenti-pilosula, superne ± glabra, 1.5—2 mm diam. *Bracteae* anguste ovatae vel lanceolatae, acutae, fere 2 mm longae, subpersistentes. *Pedicelli* apicem versus incrassati, bini, basi brevissime connati, ad basin pilosuli ceterum glabri, 5—6 mm longi. *Perianthium* 12—13 mm longum, in vivo flavidum, haud raro rubescens vel violascenti-tinctum, glabrum, tubo 0.5 mm diam., limbo sensim clavato 3 mm longo, 1.2—1.5 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* oblongae, liberae, distantes. *Ovarium* glabrum. *Fructus* deest.

CELEBES. S. Celebes. Peak of Bonthain, 2600 m: *Bünnemeijer 12320* (BO; L, *typus*), fl. 19-VI-21; ibid., 1900 m: *Bünnemeijer 12152*; ibid., 2400—2500 m: *Bünnemeijer 11934, 12391*; ibid., Lanjienga: *Teysmann 14117*.

Sterile, but very similar and probably conspecific:

CELEBES. S. Celebes. Gowa, Lembaja, 1700 m: *NIFS bb. 20428*.

48. H. acutifolia Sleum., Bot. Jahrb. 70, 1939, 140.

Arbor parva c. 6 m alta. *Ramuli* graciles, in partibus junioribus dilute brunnei, ad apices adpresse rufo-pilosi, ceterum cito glabrescentes et cinerascentes, lenticellis rotundis pallidioribus numerosis obtecti. *Folia* lanceolata vel oblongo-lanceolata, apice sensim subcaudato-acuminata, acuta, basi in petiolum attenuata et interdum usque fere ad basin ipsam petioli decurrentia, in sicco saturate castanea et opaca, chartacea, glabra, integra vel imprimis antice obscure paucidenticulata, 5—7(—10) cm longa, 2—3 cm lata, costa supra parum, subtus manifestius prominente, nervis lateralibus utroque latere c. 8 utrinque obscure prominentibus, leviter curvatis, inconspicue anastomosantibus, venis venulisque dense reticulatis minute elevatis; petiolus gracilis 4—5 mm longus. **Racemi** ex axillis foliorum terminalium orti, graciles, ascendentes, subdensiflori, 7—12 cm longi, ubique sparse adpresse rufo-pilosi. *Rhachis* 0.5—0.8 mm diam. *Bracteae* minutae, cito caducae. *Pedicelli* saepius bini, liberi vel basi connati, graciles, 2—3 mm longi. *Perianthium* in vivo flavescenti-albidum, fere plane evolutum 9 mm longum, tubo 0.5 mm diam., limbo subacuto c. 1 mm diam. *Antherae* 1.2 mm longi. *Glandulae hypogynae* subquadratae, basi tantum connatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr., Mt Victoria, below "The Gap", c. 2040 m: *Carr 15210* (A; B, *typus*; BM, K, L, SING).

49. H. saruwagedica Sleum., Bot. Jahrb. 70, 1939, 138.

Arbor parva fruticosa, c. 5 m alta, cortice griseo-brunneo fissuris minutissimis instructo. *Ramuli* glabri, novelli subangulati atrescentes, vetustiores teretes cortice saturate griseo obtecti, lenticellis rotundis albescentibus laxe adspersi. *Folia* lanceolato-oblonga usque late oblonga, apice breviter obtuse attenuata, basi late cuneata vel subrotundata, firmule subcoriacea, novella in sicco nigrescenti-brunnea, adulta supra flavido-olivacea, subtus brunnea, utrinque, imprimis supra, sublucida, integra, (8—)10—15(—19) cm longa, (3.5—)4—6(—8, raro usque ad 10) cm lata, costa supra parum, subtus valde prominente, nervis lateralibus utroque latere 7—8 utrinque parum prominentibus et leviter curvatis vel rectiusculis, utrinque parum prominentibus, venis venulisque laxe reticulatis minuteque elevatis, sed subtus saepius bene visibilibus; petiolus 2—7 mm longus, incrassatus, rugosus. *Racemi* axillares, ± penduli, sat densiflori, 8—14(—18) cm longi, glabri vel subglabri. *Rhachis* subteres, c. 1—1.5 mm diam. *Bracteae* minutae, acutae, fere scariosae. *Pedicelli* 3—4 mm longi, plerumque bini, basi tantum connati. *Perianthium* 10—12(—13) mm longum, in vivo pallide flavidum, interdum flavido-virescens vel rubescens, glabrum, tubo 0.6 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* c. 1.5 mm longae. *Glandulae hypogynae* subquadratae, liberae, approximatae. *Ovarium* glabrum, stylo apice incrassato. *Fructus* fere maturus (*Womersley & Hoogland 4952*) oblique anguste ellipsoideus, subfusiformis apice in rostrum curvatum attenuatus, basi subtruncatus, laevis 3—3.5 cm longus, 1.5—1.7 cm diam., in vivo viridis, demum nigrescens.

NEW GUINEA. NE. New Guinea. Morobe Distr., Abe, Sarawaket, 1200—1800 m: *Clemens 8343a* (B, *typus*). Wantoat (Wantot), 1050—1800 m: *Clemens 11003a*. Matap, 1500—1800 m: *Clemens 11235a*. Western Highl., Nondugl. c. 1600 m: *N. G. F. 4952, 4962 Womersley & Hoogland, N. G. F. 4423 Womersley, Gyldenstolpe*.

50. H. saurauioides Sleum. sp. nov.

Arbor? *Ramuli* novelli dense pilis rufis brevibus adpresse tomentelli, vetustiores cito glabrati et corticati lenticellisque rotundis pallidioribus laxe adspersi. *Folia* oblonga vel subobovato-oblonga, apice brevissime obtuse acuminata vel subrotundato-obtusata, basi breviter in petiolum cuneata et secus petiolum ± decurrentia, subcoriacea, in sicco saturate castanea, supra nitidula, subtus opaca, integra vel antice remote glanduloso-denticulata (dentibus minutissimis vix 0.5 mm altis et irregulariter 5—20 mm distantibus), novella utrinque sat dense adpresse rufo-pilosa, maturitate supra omnino glabra, subtus ad costam et nervos subdense, per faciem laxe brevissime adpresse diutius rufo-pilosa, (13—)15—26 cm longa, (5.5—)6.5—11 cm lata, costa utrinque bene prominente, nervis lateralibus utroque latere 18—20 leviter curvatis, inter sese ± parallelis, praeter marginem excurrentibus, haud vel obscure arcuato-conjunctis, aliis minus distinctis paucis intermixtis, omnibus supra parum, subtus arcte prominentibus, venis venulisque utrinque densissime reticulatis et parum, sed visibiliter prominulis; petiolus 0.5—1 cm longus, pubescens, inferne valde crassus et rugosus. *Racemi* axillares,subdensiflori, 10—16 cm longi, erecti, in omnibus partibus breviter sat dense adpresse rufo-pilosi. *Rhachis* teretiuscula c. 1.5 mm diam. *Bracteae* subovato-lanceolatae, 1 mm longae, ± caducae. *Pedicelli* 4(—5) mm longi, bini, basi tantum connati. *Perianthium* nondum plane maturum c. 9 mm longum, tubo 0.5 mm diam., limbo breviter clavato c. 1 mm diam. *Antherae* c. 1.2 mm longae. *Glandulae hypogynae* ovatae, liberae, approximatae. *Ovarium* glabrum, stylo post anthesin 8—9 mm longo. *Fructus* ignotus.

NEW GUINEA. NW. New Guinea. Wissel Lake region, from the river to Kebon biv. Perai: *Eyma 5262* (A; BO, *typus*, K, L), fl. X-39.

51. H. latifolia White, Proc. Roy. Soc. Queensl. 34, 1922, 26.

Arbor 18—24 m, trunco 10—15 m alto, cortice brunneo vel griseobrunnescente longitudinaliter minute fisso et pustulato. *Ramuli* glabri, in partibus vetustioribus subdense lenticellis rotundis pallidis obtecti. *Folia* late elliptico-oblonga, brevissime acuminata, apice ipso obtusa, basi in petiolum brevissimum cuneata, coriacea, in sicco saturate olivaceo-brunnea, imprimis supra nitida, glabra, integra, (13—)15—22 cm longa, (6.5—)7—11 cm lata, costa crassa supra bene, subtus valde manifeste prominente, nervis lateralibus utroque latere 6—7 curvato-ascendentibus margine indistincte inter sese conjunctis, supra ± manifeste prominentibus, subtus semper distincte elevatis, venis venulisque utrinque, imprimis subtus densissime prominulo-reticulatis; petiolus 2—4 (raro usque ad 6) mm longus, 2—3 mm crassus. *Racemi* graciles, ut videtur, axillares, c. 16 cm longi, laxiflori. *Rhachis* c. 1.3 mm diam., teres, sicut pedicelli pilis brevissime adpressis laxe induta. *Pedicelli* singuli vel bini, basi infima connati, subgraciles, 3—4 mm longi. *Perianthium* haud visum, ex descr. origin. 9 mm longum pilisque sparsis exceptis glabrum. *Glandulae hypogynae* late ovatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* immaturus (*N. G. F. 1284*) oblique obovoideo-ellipsoideus, haud rostratus, iam 2 cm longus, 1.2 cm diam., maturus haud visus, ex coll. "ovoideus, c. 1.8 cm diam."

NEW GUINEA. Papua. Centr. Distr., Deva-Deva, c. 147°—8° 30′: *White 626* (BRI, *typus*). Milne Bay area, about ½ mile N of Waigani Plantation, 25 m: *N. G. F. 1284 L. S. Smith.*

NEW BRITAIN. Jacquinot Bay: *N. G. F. 1866 Mair,* rain-forest on coral limestone outcrops. Nantambu, Open Bay, 460 m: *N. G. F. 1895 Mair,* rain-forest on deep volcanic soil, fr. juv.

A specimen very similar in leaf-characters, but the inflorescence 9 cm, the pedicels 2 mm, the yellow perianth 7 mm long, seen from

NEW GUINEA. NW. New Guinea. Hollandia, c. 100 m: *Bw. 1110 Koster,* rain-forest, rather common.

H. latifolia is similar to *H. saruwagedica* Sleum. in leaf-characters, but the fruits, as far as can be concluded from immature ones, are not beaked.

52. H. moluccana (R. Br.) Bl., Ann. Sci. Nat. II, 1, 1834, 216 quoad pl. molucc.; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 83; Meisn. in DC., Prodr. 14, 1856, 438; Miq., Fl. Ind. Bat. I, 1, 1858, 983; Ann. Mus. Bot. Lugd. Bat. 1, 1864, 204; Merr., Philip. J. Sc. 11, 1916, 267. — *Roupala moluccana* R. Br., Trans. Linn. Soc. 10, 1810, 191 (*Rhopala*), nec Jack 1820 (= *H. petiolaris*), nec Roxb. 1820 (= *H. attenuata*); R. & S., Syst. Veg. 3, 1818, 429; Spreng., Syst. Veg. 1, 1825, 482. — *H. amboinensis* Miq., Ann. Mus. Bot. Lugd. Bat. 1, 1864, 204. — *H. obtusidens* Miq., l. c. 204.

Arbor (6—)15—25 m alta, cortice griseo vel brunnescente tenui, laevi, radicibus tabularibus usque ad 1.4 m altis. *Ramuli* apicibus dense pilis brevibus arcte adpressis rufescentibus obtecti, ceterum cito glabrescentes, subangulati vel subcompressi, laeves, in partibus vetustioribus corticati lenticellisque manifestis subrotundis pallidis obtecti. *Folia* oblonga vel elliptico-oblonga vel obovato-oblonga, interdum lanceolato-oblonga, rarius obovata, breviter obtuse acuminata, basi in petiolum cuneata et ± decurrentia, glabra, subcoriacea, supra in sicco flavescentia vel plerumque saturate olivacea vel castanea, nitidula, subtus plerumque castanea, opaca, integra vel rarius antice dentibus uncinatis ± obtusis paucis (rarius pluribus) serrata, (9—)12—23(—27) cm longa, (4—)5—8(—11) cm lata, costa supra subtusque prominente, nervis lateralibus utroque latere 8—10(—12) leviter arcuatis, haud vel obsolete inter sese curvato-conjunctis, utrinque parum prominentibus, aliis intercalaribus plerumque paucis minus distinctis, venis venulisque utrinque conspicue densissime prominulo-reticulatis; petiolus 0.2—0.5 (interdum usque ad 1) cm longus, ± alatus, basi valde incrassatus et rugosus, demum glabrescens. *Racemi* plerumque solitarii, ex axillis summis interdum iam defoliatis enascentes, ascendentes, sat graciles, usque ad basin densiflori, 7—15 cm longi, ubique laxe usque subdense pilis ferrugineis adpressis induti. *Rhachis* 1—1.5 mm diam. *Bracteae* ovato-acutae, c. 1 mm longae, ± caducae. *Pedicelli* sub anthesi 2—4 (raro usque ad 5) mm longi, graciles, plerumque bini, basi tantum connati. *Perianthium* in vivo albidum, flavescens vel viridescens, odoratum, gracile, 7—8(—9 mm longum, plerumque sparse adpresse pilosum, tubo 0.5 mm diam., limbo ellipsoideo c. 1.5 mm diam. *Antherae* 1.8—2.5 mm longae. *Glandulae hypogynae* late ovatae usque subrotundatae, apice truncatae et ± crenulatae vel retusae, glabrae, liberae, in vivo aurantiacae, valde approximate. *Ovarium* glabrum, stylo gracillimo. *Fructus* oblique et subcompresse ellipsoideus vel ovoideus, apice breviter apiculatus, basi subrotundatus vel late attenuatus, maturus 2.5—3 (—3.5) cm longus, 2—2.5(—3) cm diam., pericarpio firmule coriaceo 2—3 mm crasso, sulco laterali valde manifesto, pedicello 5—6 mm longo.

MOLUCCAS. Ambon: *Chr. Smith* (BM, *typus H. moluccan.*), *Zippelius*, *Binnendijk*, *de Fretes 5761* (BO, K; U, *typus H. amboin.*), *Robinson* Pl. Rumph. amb. 281, *NIFS bb. 14263*; ibid., 200 m: *Robinson 1657*; ibid., Hila: *Teysmann HB 1877* (BO; U, *typus H. obtusid.*); cult. *Hort. Bog. IV-F-22, IX-D-55, IX-D-57, IX-D-71.* Halmaheira. Tobelo, 150 m: *NIFS bb. 23755, 23761.* Ternate: *De Vriese & Teysmann*; ibid., 650—800 m: *Beguin 1304, 1542.* Tidore. Buhu Mala, 800 m: *Lam 3771.* Talaud. Karakelang, E slope of G. Piapi, 350 m: *Lam 3297.* Buru, 250 m: *NIFS bb. 25169.*

The species is not known with certainty from New Guinea. Similar in flowers, but somewhat aberrant in leaf-characters and fruit not known:

NEW GUINEA. N. New Guinea. Rouffaer River, 300 m: *Doct. v. Leeuwen 10354.* Idenburg River, 1200 m: *Brass & Versteegh 12588.* N.W. New Guinea. Wissel Lake region, E. of Tage Lake, 1750 m: *Eyma 4926.*

53. H. peekelii Lauterb.. Bot. Jahrb. 45, 1911, 359; l.c. 50, 1913, 331.

Arbuscula. *Ramuli* graciles subteretes, apicibus adpresse rufo-pilosi, ceterum mox glabrescentes et griseo-corticati. *Folia* late oblonga, apice breviter subabrupte acuminata, obtusa, basi cuneata et in petiolum decurrentia, subsessilia, chartacea vel subcoriacea, in sicco olivacea, subtus paullo pallidiora, glabra, supra nitidula, subtus opaca, integra, 16—19 cm longa, c. 7 cm lata, costa utrinque elevata, nervis lateralibus utroque latere 6—7 arcuatis vel superioribus rectiusculis sat distantibus prope marginem ± distincte curvato-conjunctis, supra minute, subtus manifeste prominentibus, venis venulisque utrinque dense reticulato-prominulis; petiolus vix 2—3 mm longus, incrassatus, rugulosus. *Racemi* prob. e nodis defoliatis orti, densiflori, 12—16 cm longi, ad rhachidem et pedicellos laxe, ad perianthia laxissime adpresse rufo-pilosi. *Rhachis* 1.5 mm diam. *Bracteae* ovato-acuminatae, acutae, c. 1 mm longae. *Pedicelli* graciles, sub anthesi (6—) 7 mm longi, plerumque bini, liberi vel basi infima tantum connati. *Perianthium* 11 mm longum, in vivo prob. albidum, tubo 0.6 mm diam., limbo clavato 1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* subquadratae, inter sese ± in cupulam crenulatam connatae. *Ovarium* glabrum, stylo gracili. *Fructus* nondum adest.

NEW IRELAND. Namatanai: *Peekel 242* (B, *typus*).

Kanehira & Hatusima, Bot. Mag. Tokyo 52, 1938, 354 mention *H. aff. peekelii* Lauterb. from Rabaul, New Britain, sterile in thickets at about 200 m, *Kanehira 3982*. I have not seen this specimen.

Of all species of *Helicia* this comes nearest to *H. moluccana* (R. Br.) Bl. as far as can be seen from the characters of the leaf and the inflorescences, the fruit not yet being known.

54. H. neglecta Diels ex Sleum., Bot. Jahrb. 70, 1939, 135.

Arbor, ut videtur. *Ramuli* dilute brunnei, glabri, sat dense lenticellis minutis rotundis pallidis obtecti. *Folia* oblonga, apicem versus gradatim acuminata, apice ipso subobtusa, basi sensim cuneata et ± in petiolum decurrentia, subsessilia, subcoriacea, in sicco supra olivaceo-viridia et subnitida, subtus ± opaca et brunnescentia, glabra, margine grosse subsinuato-serrata (dentibus obtusis fere 2 mm altis, 8—12 mm distantibus), 18—25 cm longa, 8—9.5 cm lata, costa supra parum, subtus valde prominente, nervis lateralibus utroque latere c. 14 leviter curvatis et ascendentibus, supra in sicco levissime impressis, subtus conspicue prominentibus, aliis minus distinctis subtusque parum elevatis intermixtis, venis venulisque laxe reticulatis supra fere obscuris, subtus parum prominulis; petiolus 4—5 mm longus, 2—3 mm crassus, basi ipsa valde incrassatus et rugosus. *Racemi* axillares solitarii, densiflori, pedunculo c. 2 cm longo incluso c. 11.5 cm longi, ubique laxe pilis adspersis rufis obsiti. *Rhachis* angulata, c. 1.5 mm diam. *Bracteae* ovatae, minutae, citissime caducae. *Pedicelli* bini, infima basi connati, crassiusculi, sub anthesi (6—)7 mm longi, postremo usque ad 9 mm accrescentes. *Perianthium* in vivo prob. albidum, c. 12 mm longum, tubo 0.5 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* in annulum connatae. *Ovarium* glabrum, stylo gracili. *Fructus* ignotus.

NEW IRELAND. Ugana, 100 m: *Peekel 1249* (B, *typus*).

55. H. macrostachya Lauterb., Bot. Jahrb. 50, 1913, 332.

Arbor parva. *Ramuli* glabri, in partibus recentissimis angulati, in partibus vetustioribus subteretes, striati, demum griseo-corticati, stigmatibus foliorum delapsorum subtriangularibus. *Folia* obovato-oblonga vel obovata, apice latissime attenuata, obtusa usque subrotundata, basi in petiolum brevissimum cuneata et decurrentia, firmule subcoriacea vel coriacea, in sicco atro-brunnea vel omnino atrescentia, supra nitidula, subtus fere opaca, glabra, integra, 14—17 cm longa, 5—6 cm lata, costa supra parum, subtus valde prominente, nervis lateralibus utroque latere c. 7 a costa angulo 30—35° abeuntibus, inferne rectiusculis, praerupte ascendentibus, superne prope marginem curvatis et obscure anastomosantibus, utrinque prominentibus, venis venulisque utrinque dense reticulatis minuteque elevatis; petiolus crassus, c. 2 mm longus. *Racemi* e nodis ramulorum defoliatorum orti, pedunculo c. 2 cm incl. c. 42 cm longi, ± laxiflori, ad rhachidem et pedicellos laxe adpresse pilosi. *Rhachis* subteres, c. 2.5 mm diam. *Bracteae* ovato-acuminatae, minutae. *Pedicelli* bini, usque ad $^1/_3$ long. connati, sat graciles, 4—5 mm longi. *Perianthium* glabrum, c. 20 mm longum, tubo 0.6—0.7 mm diam., limbo elongato-ellipsoideo 1.5—2 mm diam. *Antherae* 3.5 mm longae. *Glandulae hypogynae* ovatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Morobe Distr., in mountain-forest near Pema (Waria river region), c. 400 m: *Schlechter 19432* (B, *typus*; P).

56. H. ceylanica Gardn., Calc. J. Nat. Hist. 7, 1847, 453; Meisn. in DC., Prodr. 14, 1856, 438 (*zeylanica*); Thwait., En. 1861, 250; Bedd., For. Man. 1872, 178; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 190; Trimen, Handb. Fl. Ceylon 3, 1895, 457, Atlas 4, 1898, t. 79.

Arbor parva c. 6 m alta, cortice laevi saturate griseo. *Ramuli* glabri, cito griseo-corticati, teretiusculi. *Folia* obovata vel obovato-oblonga, apice latissime attenuata, obtusa vel rotundata, interdum retusa, basi in petiolum brevissimum cuneata et decurrentia, in sicco supra flavescenti-olivacea et subnitida, subtus brunnea et opaca, modice coriacea, glabra, integra sed interdum remote pauciserrata, 5—10(—15) cm longa, 3—4.5(—5) cm lata, costa supra fere plana vel leviter prominente, subtus bene elevata, nervis lateralibus utroque latere 7—8, infimis subarcuatis, superioribus rectiusculis ante marginem tantum curvatis et inter sese conjunctis, in foliis immaturis, cum venis utrinque parum prominentibus, in foliis adultis cum venis sat dense reticulatis supra manifeste immersis, venulis subobscuris; petiolus 3—5 mm longus, basi ipsa manifeste incrassatus et rugosus ibique in sicco nigrescens. *Racemi* axillares vel e nodis defoliatis orti, satis densiflori, 5—7(—10) cm longi, glabri vel ad pedicellos tantum pilis solitariis rufescentibus adpressis instructi. *Rhachis* angulata, c. 1 mm diam. *Bracteae* ovatae, acutae, pedicellis adpressae, minutissimae. *Pedicelli* crassiusculi, plerumque bini, liberi vel basi infima tantum connati, 3—5 mm longi. *Perianthium* in vivo flavescens, 16—24 mm longum, tubo c. 0.7 mm diam., limbo ellipsoideo-clavato 1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* ovato-oblongae, apice minutissime erosae, valde approximatae, liberae vel in inferiore parte connatae. *Ovarium* glabrum, stylo filiformi. *Fructus* late ovoideus, acuminatus, purpureo-atrescens, fere 2 mm longus.

CEYLON. Centr. Prov. "Banks of the Massnawatté in the Ambegamoa distr.": *Gardner* (Herb. Peradenya?, *typus*, haud vidi). Loco haud ind.: *Thwaites C. P. 690* (B, FI, K, MEL, P). Trimen p. 457: 600—1200 m, near Navavapitya (*Gardner*), Dolosbagie, Galagama, Rangala, rather rare.

57. H. retevenia Sleum., Bot. Jahrb. 70, 1939, 141.

Arbor parva c. 4 m alta. *Ramuli* angulati, novelli minute adpresse pilosi, cito glabrescentes et griseo-albido-corticati. *Folia* obovato-oblonga, apice ± rotundata, basi in petiolum attenuata et decurrentia, subcoriacea, rigidula, supra lucida, subtus opaca, in foliis juvenilibus ad costam pubescentia, matura omnino glabra, in sicco olivaceo-brunnescentia, integra, 6—8 cm longa, 2.2—2.6(—3.4) cm lata, margine paullo revoluta, costa utrinque prominente, nervis lateralibus utroque latere 8(—9) inferne rectiusculis, marginem versus curvatis et anastomosantibus, aliis intercalaribus nonnullis minus distinctis intermixtis, omnibus supra manifeste impressis, subtus parum prominentibus, venis venulisque supra sat dense reticulatis et impressis, subtus subinconspicuis; petiolus gracilis, c. 1 cm longus. *Racemi* axillares, subdensiflori, glabri, c. 8 cm longi. *Rhachis* gracilis, angulata, 1 mm diam. *Bracteae* lanceolatae, acutae, fere 1 mm longae. *Pedicelli* sat graciles, plerumque bini et $^1/_3$ usque ad $^1/_2$ long. connati, 4—5 mm longi. *Perianthium*, ut videtur, in vivo viridescenti-albidum, 15—16 mm longum, gracile, tubo 0.5 mm diam., limbo 1.2 mm diam. *Antherae* 2.5 mm longae.

Glandulae hypogynae oblongo-ovatae, usque ad medium connatae, cupulam crenatam formantes. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr. Mt Victoria, below "The Gap", c. 1980 m: *Carr 13761* (B, *typus*; BM, L, SING).

58. H. obtusata Sleum., Bot. Jahrb. 70, 1939, 139.

Arbor ex coll. alta, trunco 20—60 cm diam. *Ramuli* fere teretes, rubrobrunnei, glabri. *Folia* obovata, apice latissime attenuata et obtusa, haud raro rotundata, interdum leviter retusa, basi in petiolum cuneata, fere usque ad petioli basin decurrentia itaque subsessilia, coriacea, glabra in sicco supra flavido-olivacea vel brunnea et nitidula, subtus brunnea et opaca, integra, 11—14(—18) cm longa, 5.5—7(—9.5) cm lata, costa utrinque bene prominente, subtus valida, nervis lateralibus utroque latere 10—11 a costa angulo subrecto abeuntibus, rectiusculis, apice quasi bifidis, ante marginem distincte curvato-anastomosantibus, aliis pluribus brevioribus intermixtis, omnibus supra parum, subtus manifestius prominentibus, venis venulisque utrinque satis dense reticulatis et prominulis; petiolus 0.5—1 (raro usque ad 1.5) cm longus, ± manifeste alatus, validus, basi incrassatus et rugosus. *Racemi* ex axillis foliorum summorum enascentes, densiflori, (sub)glabri, in sicco nigricantes, 10—14 cm longi. *Rhachis* angulata, c. 2.5 mm diam. *Bracteae* ovato-acutae, 1 mm longae, subpersistentes. *Pedicelli* bini, crassiusculi, basi connati, 5—7 mm longi. *Perianthium* in vivo albidum, flavescens vel albescenti-virescens, c. 20 mm longum, tubo 0.8—1 mm diam., limbo subacuto c. 2.2 mm diam. *Antherae* c. 4 mm longae. *Glandulae hypogynae* late ovatae, fere quadratae, liberae, approximatae. *Ovarium* glabrum. *Fructus* maturus nondum cognitus.

NEW GUINEA. NE. New Guinea. Morobe Distr., Yunzaing, 1200—1500 m: *Clemens 2318* (A; B, *typus*); ibid., c. 1370 m: *Clemens 6472*. Ogeramnang, c. 1700—1800 m: *Clemens 5530, 5446*. Mt Sarawaket, "bog meadow camp", 2740 m (?): *Clemens 5595* (B †).

59. H. archboldiana Sleum. sp. nov.

Arbor parva, 3 m alta. *Ramuli* teretiusculi, glabri, cito corticati. *Folia* elliptica vel oblongo-elliptica, apice breviter subabrupte acuminata, subacuta vel obtusa, basi late cuneata et in petiolo decurrentia, tenuiter coriacea, rigidula, utrinque nitidula, in sicco utrinque aequaliter rubro-brunnea, glabra, sat regulariter subserrato-denticulata (dentibus glandula terminatis 0.5—1 mm altis, 4—10 mm distantibus), 8—12 cm longa, 4—6 cm lata, costa utrinque elevata, nervis lateralibus utroque latere c. 10 a costa angulo subrecto abeuntibus, rectiusculis, ante marginem curvatis interque sese conjunctis, aliis pluribus minus distinctis intermixtis, omnibus in utraque pagina parum sed bene visibiliter prominentibus, venis venulisque densissime reticulatis et prominulis; petiolus 0.5—1 cm longus, per fere totam longitudinem lamina decurrente alatus, rugosulus, basi incrassatus. *Racemus* unicus visus, ex axilla folii delapsi ortus, ascendens, in rhachide et pedicellis subdense, in perianthiis laxe adpresse rufo-substrigoso-pilosus, subdensiflorus, 15 cm longus. *Rhachis* teres, sat gracilis, c. 1—1.3 mm diam. *Bracteae* ovato-acuminatae, minutae, pilosulae. *Pedicelli* solitarii vel bini, basi infima connati, graciles, 3 mm longi. *Perianthium* in vivo viride, basi violascens, c. 22—23 mm longum, tubo 0.5 mm diam., limbo elongato-ellipsoideo acutiusculo 1.5 mm diam. *Antherae* c. 2 mm longae. *Glandulae hypogynae* subquadratae vel obovato-truncatae, liberae, approximatae, apice minutissime denticulatae vel crenulatae. *Ovarium* glaber, stylo gracili apice elongato-clavato. *Fructus* deest.

NEW GUINEA. W. New Guinea. 8 km SW of Bernhard Camp, Idenburg River, 1600 m: *Brass 12728* (A, *typus*), in mossy forest undergrowth, fl. II-39.

60. H. wollastonii Ridl., Trans. Linn. Soc. Bot. 9, 1916, 145.

Arbor? *Ramuli* glabri teretes nitiduli. *Folia* obovato-oblonga vel obovata, apice breviter abrupte subcuspidato-acuminata, acuta vel obtusiuscula, basi in petiolum cuneata et ± decurrentia, subcoriacea, glabra, supra nitida, subtus ± opaca, in sicco supra sordide viridi-olivacea vel -brunnescentia, subtus brunnea, glabra, integra, 12—17 cm longa, 5—7 cm lata, costa supra subtusque bene elevata, nervis lateralibus utroque latere 7—8 arcuatis et manifeste anastomosantibus, aliis intercalaribus brevioribus pluribus, omnibus supra bene impressis, subtus arcte prominentibus, venis venulisque utrinque dense reticulatis et parum, sed bene visibiliter prominulis, saepius discoloribus; petiolus sat validus, 1—1.5 cm longus, fere ad basin breviter alatus, glaber, basi valde incrassatus et transverse rugosus. *Racemi* axillares, graciles, fere usque ad basin laxiflori, 10—15 cm longi. *Rhachis* glabra, striatula, c. 1.2 mm diam. *Bracteae* subulatae minutissimae. *Pedicelli* graciles 5—6 mm longi, glabri. *Perianthium* in vivo pallide flavidum, in sicco nigrescens, 15—16 mm longum, glabrum, tubo 0.4—0.5 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* fere 2 mm longae. *Glandulae hypogynae* ovatae vel subrotundae, carnosulae, liberae, approximatae. *Ovarium* glabrum. *Fructus* ellipsoideus, apiculatus, 2.5 cm longus, 1.8 cm diam., basi parum attenuatus, pericarpio 2 mm crasso.

NEW GUINEA. S. New Guinea. Utakwa River, Canoe camp, 45 m: *B. Kloss* anno 1912 (BM, *typus*).

61. H. formosana Hemsl. in Forb. & Hemsl., J. Linn. Soc. 26, 1891, 394; Ann. Bot. 9, 1895, 156, t. 8; Ito, Ill. Formos. Pl. 1927, t. 522; Sasaki, Cat. Govt Herb. Form. 1930, 185. — *H. tsangii* Li, J. Arn. Arb. 24, 1943, 363.

var. **formosana**.

Frutex elatus vel arbor 3—7(—10) m alta, cortice transverse et longitudinaliter fisso, ramulis recentissimis dense rufo-tomentosulis, annotinis rubrobrunneis glabratis, vetustioribus cortice griseo vel brunnescenti laxeque lenticellis subrotundis obtectis. *Folia* obovato-oblonga, rarius (late) oblonga, apicem versus sensim acuminata, apice ipso saepius paullo curvato subacuta vel obtusiuscula, basi breviter in petiolum cuneata, subsessilia, firmule chartacea usque subcoriacea, supra in sicco subatrescenti-viridia, subtus brunnea, utrinque opaca, rarius supra parum nitentia, sat regulariter et dense serrata (dentibus prorsus versis parum uncinatis glandula terminatis subacutis 1—2 mm altis et 4—10 mm distantibus), rarius antice tantum paucidentata, ceterum subintegra, novella utrinque ± dense rufo-ferrugineo-pilosa, adulta supra costa diutius pubescente excepta glabra, demum glaberrima, subtus diutius per faciem et nervos laxe, ad costam densius pilis subadpressis rufescentibus induta, tarde glabrescentia, (8—)12—26 cm longa, (4—)5—7(—10) cm lata, costa supra parum, subtus manifeste elevata, nervos lateralibus utroque latere 8—10(—12, rarius ad 15) curvato-ascendentibus, praeter marginem subobscure anastomosantibus, aliis intercalaribus minus distinctis pluribus additis, omnibus supra fere planis, subtus prominentibus, venis utrinque laxis, venulis supra obscuris, subtus dense reticulatis et parum prominulis; petiolus 0.5—1 cm longus, plerumque per fere totam longitudinem lamina decurrente alatus, basin versus exalatus et incrassatus, diutius tomentosulus. *Racemi* axillares vel ad nodos defoliatos orti, solitarii, ascendentes, densiflori, (7—)10—16 cm longi. *Rhachis* teres sicut pedicelli ± dense pilis subpatentibus ± crispulis rufis induta, 1.5—2 mm diam. *Bracteae* ovati-acutae, pilosae, c. 1 mm longae, subpersistentes. *Pedicelli* sat graciles, bini, basi connati, 3—4 mm longi. *Perianthium* in vivo albidum val flavescens, laxe usque sat dense subadpresse rufo-pilosum, gracile, (16—)18—20 mm longum, tubo 0.4—0.5 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* subrotundato-ovatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* suboblique depresso-globosus, in sicco brunneus, apice apiculatus, basi brevissime contractus, minute corticato-verruculosus, c. 1.5—2 cm diam.

INDOCHINA. Tonkin. NE of Mon-cay, Pac-si and vicinity: *Tsang 26880*. Hacoi, Taai Wong Mo Shan, near Chuk-phai: *Tsang 28974, 29174* (A, *typus H. tsangii*). Massif du Tam Dao, 1000 m: *Pételot 3888*.

CHINA. Hainan. Ngo Ko Shan, Ch'ang-kiang distr.: *Lau 1884*. Lok-tung: *Lau 27163*. Kwangtung. Sup Man Ta Shan: *Liang 69656*.

FORMOSA. NE Distr. at 120 m: *Wilford 517* (K, *lecto-typus H. formos.*). Kelung: *Ford 46*. Bankinzing: *Henry 511, 805, 805a*, *Faurie 1189*. S. Cape: *Henry 1225*. Urai: *Suzuki 3217*. Hori, 350 m: *Gressitt 250*. Arisan, prov. Kagi, 1000—1330 m: *Wilson 9789, 10889*. E. Coast plain: *Price 446*. S. mountains, c. 1200 m: *Price 542*. Loco haud ind.: *Kanehira 3105, Price 913, 1121, Kawakami 263, Faurie 8241 B, 8245*.

61a. var. **oblanceolata** Sleum. var. nov.

A typo foliis oblanceolatis basin versus ± longe cuneatis 15—35 cm longis, (3—)3.5—5.5 cm latis differt.

CHINA. Hainan. Chin Fung Mt: *Lau 5000*.

SIAM. Payap, Doi Angka, E slope, 1560 m: *Garrett 399*; Doi Intanon, 1300—1500 m: *Kerr 5335*; Doi Nang ka: *Put 3482*; Pang Tawn: *Put 3928*. Maharat, Nan, Doi Tiu, 1200 m: *Kerr 5037*. Nakawan Sawan, Kao Pado, 700 m: *Kerr 6060* (BM, *typus* var. *oblanceol.*). Rachasima, Pu Kio, Chaiyapum, 1000 m: *Kerr 20251*.

INDOCHINA. Laos. Ht. Mékong, entre Vieu Pou Kha et Ta Fa, 800 m: *Poilane 26395*.

62. H. affinis Sleum., Bot. Jahrb. 70, 1939, 137. — *H. moluccana* (non (R. Br.) Bl.) Lauterb., l. c. 50, 1913, 331.

Arbor parva. *Ramuli* teretes in sicco rubescenti-brunnei, in partibus vetustioribus sat dense lenticellis parvis subrotundis pallidis obtecti. *Folia* oblonga vel obovato-oblonga, apice brevissime lateque acuminata, obtusa, basi cuneata sensim in petiolum cuneata et decurrentia, firmule chartacea, glabra, in sicco utrinque subnitida et brunnea, subtus paullo pallidiora, integra, (16—)21—30 cm longa, (6.5—)7.5—10 (raro usque ad 13) cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 8—9 curvato-ascendentibus et praeter marginem longe excurrentibus, haud anastomosantibus, supra parum, subtus manifeste prominentibus, venis venulisque utrinque dense reticulatis minuteque prominulis; petiolus 4—5 mm longus, 3—4 mm crassus, rugosus. *Racemi* ex axillis superioribus enascentes, usque ad basin densiflori, 14—22 cm longi, ad rhachidem subdense, ad pedicellos et perianthia laxe vel laxissime pilis brevibus adpressis rufescentibus obtecti. *Rhachis* teres, 1.5 mm diam. *Bracteae* ovatae, acutissimae, minutae. *Pedicelli* plerumque bini et basi connati, 2—3 mm longi. *Perianthium* 14—15 mm longum, tubo 0.5 mm diam., limbo ellipsoideo 1.3 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* late oblongae vel subquadratae, liberae vel basi cohaerentes. *Ovarium* glabrum, stylo gracili. *Fructus* haud visus.

NEW GUINEA. NE. New Guinea. Madang Distr., Kani Mts, 600 m: *Schlechter 17640* (B, *typus*; P); ibid., 1100 m: *Schlechter 17119* (P).

63. H. clemensiae Sleum., Bot. Jahrb. 70, 1939, 139.

Arbor parva, ramulis varie angulatis ad internodia incrassatis, innovationibus adpresse rufo-pilosis ceterum glabris. *Folia* ampla, obovata, apice ± rotundata, basin versus gradatim cuneata, basi ipsa valde obtusata vel truncata, in superiore petioli parte decurrentia, subsessilia, subcoriacea, utrinque subnitentia, glabra, in sicco supra flavido-olivacea, subtus plerumque saturate castanea, interdum utrinque ± nigrescentia, integra, (14—) 19—26 cm longa, (8—)9—14 cm lata, costa utrinque, praecipue subtus crasse prominente, nervis lateralibus utroque latere c. 10 arcuato-ascendentibus praeter marginem excurrentibus vel superioribus tantum subobscure anastomosantibus, supra parum, subtus distincte prominentibus, venis venulisque supra parum, subtus manifestius laxe reticulatis et prominulis; petiolus 3—4 mm longus, 2—3 mm crassus, rugosus. *Racemi* axillares vel e nodis defoliatis orti, densiflori, 16—19 cm longi, ad rhachidem et pedicellos sat dense usque laxe, ad perianthia laxissime pilis adpressis rufescentibus brevibus induti. *Rhachis* 1.5—2 mm diam. *Bracteae* ovato-lanceolatae, acutae, 1 mm longae. *Pedicelli* plerumque gemini basique connati, 5—6 (—7) mm longi. *Perianthium* in vivo albidum, 28—30 mm longum, tubo 0.6—0.8 mm diam., limbo elongato-clavato 6—7 mm longo et c. 2 mm diam. *Antherae* 5—6 mm longae. *Glandulae hypogynae* in cupulam brevem apice minute erosam vel denticulatum connatae. *Ovarium* glabrum, stylo crassiusculo apice elongato-fusiformi. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Morobe Distr., Wareo (Sattelberg), c. 600 m: *Clemens 1670* (B, *typus*; L), *1425*.

64. H. forbesiana F. v. M., Vict. Nat. 3, 1886, 63; Bot. Centralbl. 29, 1887, 84; Descr. Not. Pap. Pl. 9, 1890, 61; Bail., Queensl. Agric. J. 24, 1910, 22; Lauterb., Bot. Jahrb. 50, 1913, 331; Sp. Moore, J. Bot. 61, 1923, Suppl. 43; Sleum., Bot. Jahrb. 70, 1939, 139.

Arbor c. 15 m alta, trunco cortice sat laevi pallide brunneo obscure longitudinaliter fisso, ramulis apicibus sat dense adpresse rufo-pilosis, ceterum glabrescentibus, teretibus, griseo-corticatis. *Folia* lanceolata vel lanceolato-oblonga, haud raro oblanceolata, apice sat abrupte acuminata, subacuta vel obtusiuscula, basin versus longe sensim in petiolum cuneata et ± decurrentia, basi ipsa subacuta, subcoriacea, in vivo saturate viridia et lucida, subtus pallidiora, in sicco supra olivaceo- vel flavescenti-virescentia, subnitida, subtus opaca et castanea, integra vel rarissime remote minuteque denticulata, glabra, 15—25(—30) cm longa, 5—8(—11) cm lata, costa utrinque imprimis subtus prominente, nervis lateralibus utroque latere 9—10 arcuatis inter sese ± manifeste curvato-conjunctis, supra leviter impressis vel planis, subtus bene prominentibus, venis venulisque sat dense reticulatis utrinque prominulis vel subtilibus; petiolus 3—8 mm longus, basi 2—4 mm incrassatus et rugosus, glaber. *Racemi* e nodis defoliatis orti, subrecti, densiflori, pedunculo c. 2 cm longo incl. 10—15 cm longi, ad rhachidem et pedicellos subdense, ad perianthia laxe vel laxissime pilis rufis adpressis obsiti. *Rhachis* rigida, basi 2—3 mm diam. *Bracteae* elongato-ovatae, acutae, 1—1.5 mm longae. *Pedicelli* 0.5 mm crassi, sub anthesi 6—9 mm longi, saepius gemini et basi infima connati. *Perianthium* in vivo albidum, rigidulum, 27—28 mm longum, tubo 1 mm diam., limbo sensim clavato 5—6 mm longo et 2—2.5 mm diam. *Antherae* 4 mm longae. *Glandulae hypogynae* in annulum depressum obscure 4-denticulatum connatae. *Ovarium* glabrum, stylo crassiusculo. *Fructus* immaturus oblique ovoideus, maturus incognitus.

NEW GUINEA. Papua. Centr. Distr., Meroka: *Forbes 343* (B; BM, *lecto-typus*). Sogeri: *Forbes 387*. Mt Wori-wori, c. 1525 m: *Forbes 723*. Koikoko Range, c. 760 m: *Forbes 799*. Boku: *Schlencker* (NSW, haud vidi). Loc. not given: *Forbes 678*. Northern Distr., Patikiari-Gwaiari, 25 m: *Hoogland 3638* (somewhat different by larger leaves). Milne Distr., Milne Bay: *N. G. F. 1284*.

65. H. robusta (Roxb.) R. Br. ex Wall., Cat. 1831, sub nr 2702; Bl., Ann. Sci. Nat. II, 1, 1834, 220; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 83; Hassk., Cat. alt. hort. Bog. 1844, 94; Meisn. in DC., Prodr. 14, 1856, 440; Miq., Fl. Ind. Bat. I, 1, 1858, 986; Bedd., Man. 1872, 173; Flor. Sylv. 1873, t. 301; Kurz, For. Fl. Br. Burma 2, 1877, 311; F.-Vill., Nov. App. 1880, 182; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 191; Boerl., Handl. 3, 1, 1900, 151; Gamble, J. As. Soc. Beng. 75, ii, 1914, 344; Ridl., Fl. Mal. Pen. 3, 1924, 142; Gamble, Fl. Madr. 2, 1925, 1243; Bak. f., J. Bot. 63, 1925, Suppl. 89; Henders., Gard. Bull. Str. Settl. 4, 1928, 314; Kanjilal, Kanjilal, De & Das, Fl. Assam 4, 1940, 106; Suesseng. in Heine, Fedde Rep. 54, 1951, 225. — *Roupala robusta* Roxb., Hort. Beng. 1814, 83, nom. nud.; Fl. Ind. ed. Carey & Wall. 1, 1820, 366 (*Rhopala*); Spreng., Syst. Veg. 1, 1825, 482 pr. p. (p. alt. = *H. cochinch.*); R. & S., Mant. 3, 1827, 285; Roxb., Fl. Ind. ed. Carey 1832, 363; Wight, Ic. Pl. Ind. Or. 1839, t. 191. — *Rupala serrata* Reinw. in Bl., Cat. Buitenz. 1823, 42, nom. nud. — *Helittophyllum javanicum* Bl., Bijdr. 1826, 652. — *Roupala glabrata* Wall., Cat. 1829, n. 1039 (*Rhopala*), nom. nud. — *H. macrophylla* Wall., Cat. 1831, n. 3663, nom. nud. — *H. javanica* (Bl.) Bl., Ann. Sci. Nat. II, 1, 1834, 217; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 81, 83, t. 18; Meisn. in DC., Prodr. 14, 1856, 440; Miq., Fl. Ind. Bat. I, 1, 1858, 986; Kurz, Nat. Tijd. Ned. Ind. 27, 1864, 172; K. & V., Bijdr. Booms. Java 5, 1900, 306; Greshoff, Meded. 's Lands Plantent. 29, 1900, 181; Ridl., Agric. Bull. Str. & F. M. S. 1, 1902, 248; Koord., Exk. Fl. Java 2, 1912, 155, f. 33; Atlas Baumart. Java 1915, t. 597; Ridl., J. Fed. Mal. St. Mus. 8, 1917, 81; Koord., Fl. Tjibod. 1923, 47; Heyne, Nutt. Pl. 1927, 588; Ochse & Bakh. v. d. Br., Ind. Groent. 1931, 620, f. 379; Burk., Dict. 1935, 1133; Back., Bekn. Fl. Java em. ed. IV, 2, 1942, fam. 79, p. 5. — *H. cumingiana* Presl, Epim. 1851, 246; Walp., Ann. 3, 1852/53, 332; Meisn. in DC., Prodr. 14, 1856, 440; Miq., Fl. Ind. Bat. I, 1, 1858, 986; F.-Vill., Nov. App. 1880, 182; Vid., Phan. Cuming. Philipp. 1885, 139; Rev. Pl. Vasc. Filip. 1886, 229; Merr., Philip. J. Sc. 1, 1906, Suppl. 49; En. Philip. 2, 1923, 99 incl. var. *parvifolia* Merr. l. c. 99. — *H. philippinensis* Meisn. in DC., Prodr. 14, 1856, 441; Miq., Fl. Ind. Bat. I, 1, 1858, 987; F.-Vill., Nov. App. 1880, 182; Vid., Phan. Cuming. Philip. 1885, 140; Rev. Pl. Vasc. Filip. 1886, 229; Sin. Atl. 1883, 37, t. 79; Merr., Philip. J. Sc. 1, 1906, Suppl. 49. — *H. glabrata* Meisn. in DC., Prodr. 14, 1856, 442, nomen. — *H. castaneaefolia* Meisn., l. c. 441; Miq., Fl. Ind. Bat. I, 1, 1858, 986; F.-Vill., Nov. App. 1880, 182; Merr., En. Philip. 2, 1923, 100. — *H. attenuata* (non (Jack) Bl.) Kurz, Nat. Tijd. Ned. Ind. 27, 1864, 172. — *H. obovata* (non Benn.) Kurz, l. c. — *H. travancorica* Bedd. ex Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 191. — *H. oligophlebia* Merr., Philip. J. Sc. 11, 1916, Bot. 6; En. Philip. 2, 1923, 100. — *H. obovata* (non Benn.) Ridl., J. Mal. Br. Roy. As. Soc. 1, 1923, 90.

Frutex arborescens vel arbor parva, (2—)5—8 (raro ad 18) m alta, iam in statu frutescenti florigera et fructifera, trunco saepius curvato, cortice brunnescenti vel cinerascenti, tenui, lamuloso-deciduo. *Rami* teretes, laevigati, fuscescentes. *Ramuli* apicibus tantum adpresse rufo-pilosi ceterum cito glabrati, ± complanati, ad nodos incrassati. *Folia* sparsa, superiora vel summa saepius 3—4-pseudoverticillata vel oblique opposita, obovato-oblonga vel obovata, apice breviter subabrupte acuminata, subacuta vel obtusa, basin versus sensim attenuata et in petiolum validum ± decurrentia, basi ipsa plerumque obtusa vel truncata, rarius subcordata, interdum attenuato-acuta, firme subcoriacea, juniora in vivo subtus cobaltina, basin versus viridi-azurea, supra ± nigrescenti-azurea, matura viridia, in sicco supra olivaceo-viridia vel passim nigrescentia, subnitida, subtus castanea et opaca, interdum utrinque aequaliter brunnea, saepius subregulariter argute serrata (dentibus acutis ± incurvis, apice subglandulosis, culminibus 1.5—3 mm altis et 5—12 mm distantibus), interdum pauciserrata vel basin versus minus distincte serrata, supra glabra, subtus initio pilis solitariis adpressis fuscescentibus minutis ± laxe adspersa, maturitate ± glabrescentia, (7—)8—25(—40) cm longa, (4—)5—10(—15) cm lata, in turionibus haud raro maiora et semper manifeste serrata, costa utrinque, subtus magis prominente, in vivo saepe rubicunda, nervis lateralibus utroque latere (7—)10—12(—13) leviter curvatis alteque ascendentibus, prope marginem ± obsolete inter sese conjunctis, supra fere planis, subtus prominentibus, venis venulisque utrinque sat laxe reticulatis parum elevatis; petiolus 1—6 (raro usque ad 10) mm longus, 2—4 mm crassus, basi tumidus et rugosus. *Racemi* axillares et e nodis defoliatis enascentes, solitarii vel rarius gemini, erecti vel patuli, densiflori, 12—25(—30) cm longi, initio in omnibus partibus subdense, sub anthesi laxe usque laxissime pilis adpressis rufescentibus induti, ad perianthia interdum glabrescentes, sed ad rhachidem et pedicellos nunquam omnino glabri. *Rhachis* subangulata, in vivo rubicunda, in sicco fusca, 1.5—2 mm diam. *Bracteae* ovatae, acutae, c. 1—1.5 mm longae. *Pedicelli* crassiusculi, plerumque bini et basi connati, sub anthesi (3—)4—7, postea usque ad 9 mm elongati. *Perianthium* in vivo albidum vel flavescens vel virescenti-albidum vel -flavescens, odorum?, (18—)20—22 (rarius usque ad 25) mm longum, tubo (in sicco!) ± 0.6 (rarius usque ad 1) mm diam., limbo ellipsoideo 1.5—2.5 mm diam. *Antherae* ± 2 mm longae. *Glandulae hypogynae* late ellipticae vel ovato-oblongae, subtruncatae rarius quasi bidentatae, liberae, approximatae, sub anthesi cupulam aemulantes, postea divergentes. *Ovarium* glabrum, stylo gracili in vivo rubro. *Fructus* oblique lateque ellipsoideo-subglobosus, plerumque apice manifeste apiculatus basique substipitato-contractus, rarius apice basique subrotundatus, (2—)2.5—3(—4) cm longus, 2—3 cm diam., in vivo flavido-viridis, demum violaceo-suffusus vel nigrescens, pericarpio coriaceo 2—3 mm crasso; semen ovoideum, in superiore parte reticulato-rugosum; pedicellus 6—10 mm longus, 2—3 mm diam.

INDIA. S. India. Travancore and Tinnevelly Mts, above Paupanassam, c. 1200 m: *Beddome* (BM; K, *typus H. travancor.*). Assam. Silhet: *Roxburgh* (BM, *holotypus H. robust.*), *Wallich 3661* (K, *"H. macrophylla"*). Pundua: *De Silva (Wallich 2702).* Naga Hills: *Prain's Coll. 385.* Tingale Bam: *Prain's Coll. 812.* Kamrup, Goalpara: *Buchanan-Hamilton 432.* Sibsagar, Garo Hills, Khasi and Jaintia Hills, 900 m, cit. Kanjilal etc. p. 106. E. Bengal: *Griffith 4367 pr. p.*

BURMA. Lower Burma. Martaban, Tenasserim cit. Hook. f. p. 191. Tavoy: *Gomez, Herb. Wallich 1039, "R. glabrata* Wall." msc.

SIAM. Rachaburi, Ranawng: *Kerr 16860, 16860A.* Puket, Trang: *Collins 2402, Boonkird 46.*

MALAY PENINSULA. Kedah. Ulu Pantai Mulik: *For. Dep. F. M. S. 34607.* Trengganu. Sg. Paka: *For. Dep. F.M.S. 26793, 26894.* Pahang. Ulu Sg. Rompin: *For. Dep. F.M.S. 15467, 3221 (Foxworthy).* Johore. Sg. Sedili: *Corner.* B. Tana Abang: *Kelsall.* Kota Tinggi: *Ridley 15441.* Selangor. Kuala Lumpur, cit. Ridley p. 142, haud vidi. Malacca. *Hervey, Maingay 1309 (1792), 1311 (1791), Griffith 4367 pr. p..* Sg. Hudang: *Cuming 2338* (G, *typus H. castaneaef.*; NY). Singapore. Garden jungle and B. Timah, cit. Ridley l. c. 142, haud vidi.

SUMATRA. E. Coast. Sibolangit, 350—900 m: *Lörzing 4190, 4204, 5647, 7946, Nur SF 7416.* Atjeh, Gajolanden, Losir massif, 2100—2250 m: *v. Steenis 8441.* Karolanden, 1500 m: *NIFS bb. 8622.* Tapanuli. Bataklanden ("Hochankola"): *Junghuhn.* W. Coast. Korinchi, 750—1000 m: *Robinson & B. Kloss.* Padang, Ajer mantjur: *Beccari P.S. 499, 711.* Mt Singgalang: *Beccari P.S. 344, 363.* Mt Siboga, Padangpandjang, 780—900 m: *Schiffner 1912.* Palembang. Rawas: *Grashoff 1143.* Martapura: *Bal 16.* Mt Dempo, c. 1200 m: *Forbes 2212.* Tandjong Ring, 1800 m: *Forbes 2731a.* Benkulen. Lebong Tandai: *Brooks.* Lampung. Menggala: *Gusdorf 60.* Banka: *Horsfield, Teysmann 3476 HB, Kobus, Berkhout 36.* G. Maras, 60—70 m: *Bünnemeijer 1843, 1602.* Pangkalpinang: *Teysmann* (cit. Kurz, Nat. Tijd. Ned. Ind. 27, 1864, 172 sub *H. obovat.* & *H. attenuat.*). Billiton: *Riedel.*

JAVA. Bantam. Kosala, Lebak-jaha, c. 750 m: *Forbes 377.* Madur-Sawarna: *v. Hasselt 31.* Loco haud ind.: *Spanoghe.* Batavia. G. Bunder, 750 m: *v. Slooten 722.* Bolang, 700 m: *v. Steenis 5043.* Tjampea, 150 m: *Koorders 30443, 30444, Reinwardt, "Rup. serrata", Arsin.* G. Kendeng, 1000 m: *Backer 25889.* G. Salak: *Blume* (L, *typus Helittoph. javan.*); ibid.: *Zollinger 3023 pr. p.*; ibid., 700 m: *Koorders 24313.* Krawang: *de Monchy 65, 138.* Buitenzorg, 600 m: *Scheffer, Boerlage, Bakhuizen v. d. Br. 2825, Backer 4146, Lam 2271.* Djasinga, 200 m: *Backer 23457.* Preanger. Palabuan ratu, 400—580 m: *Koorders 6245/47.* G. Patuha, 1700 m: *v. Steenis 7439.* Takoka, 1000 m: *Koorders 15011, 15265, 25765.* Tjibodas, 1200 m: *Koorders 31938.* Lengkong-Pasawahan, 750 m: *Backer 17065.* G. Sembung, 1250 m: *Backer 12437*; ibid., 1300 m: *Lörzing 1199.* Tasikmalaja, 720 m: *Koorders 3358.* Tjigenteng: *Koorders 26436.* G. Waringin, 1500 m: *Forbes 670.* G. Handjawung, 950 m: *Backer 6054.* G. Tjikuraj, Garut: *Burck 381.* Pangentjongan, 900—1300 m: *Koorders 10987, 13837, 26827*; ibid., 1600 m: *Koorders 6248.* Barutungul, 1600 m: *Popta 26.* Tjidadap, S of Tjibeber, 900—1000 m: *Backer 22500, Bakhuizen v. d. Br. 1509, 3698, Winckel 777, 778.* G. Beser pr. Tjibeber 1000—1200 m: *Bakhuizen v. d. Br. 3855, Backer 22655.* G. Wajang: *Smith & Rant 600.* G. Papandajan: *Scheffer, Boerlage.* Plant. Malabar, 1500—1700 m: *Pulle 3199.* Preanger: *Warburg 2832.* Limbang: *Korthals.* Telaga Patengan: *Leefmans.* Tjitalahab, 750 m: *v. Steenis 12723.* Njalindung, S of Sukabumi, 900 m: *Kuntze 5171.* Tegal. Simpar-G. Slamat, 950—1190 m: *Koorders 6267, 6270.* G. Slamat, 700—800 m: *Backer 170.* Cheribon. Kuningan: *Houter 191.* Pekalongan. Lebak Barang, 300 m: *Backer 23281.* G. Prau: *Horsfield, Junghuhn.* Doro: *Doct. v. Leeuwen.* Banjumas. Pringombo, 700—1000 m: *Koorders 6273, 33789, 39065, 39071, 39162.*

BORNEO. Br. N. Borneo. Mt Kinabalu, 900—1500 m: *J. & M. Clemens 26385, 27083; 30069*; Ranau, c. 500 m: *Darnton 168.* Sandakan: *Agullana 3881.* Kinabatangan: *Evangelista 954, 1074, Br. N.B. For. Dep. 1741.* Sagaliut River: *Evangelista 700.* Elopura, Kabili-Sepilok For. R.: *Br. N.B. For. Dep. 2966, 10665.* Tambunan: *Br. N.B. For. Dep. 10488.* SE. Borneo. Hayup, N of Banjermasin: *Hub. Winkler 2195.*

W. Kutei, 25 m: *Endert 1736, 2306.* Martapura: *Korthals, Labohm 1208.* Asem, Pleihari: *Labohm 1959. Asem,* Sie Baru: *NIFS bb. 2438.*

PHILIPPINES. Luzon. Mount. Prov., Ifugao, Mt Polis: *B. S. 37688 Ramos & Edaño, PNH 20382 Mendoza, B. S. 19829 McGregor.* Benguet: *B. S. 5705 Ramos, F. B. 2207 Leaño.* Baguio: *Elmer 8346, 8763, 8885.* Mt Santo Tomas, 1900 m: *Williams 1342, B. S. 82301 Quisumbing.* Busol For. R., 1500 m: *F. B. 31400 Esguerra.* Sablang: *Elmer 6092, B. S. 12699 Fenix.* Mt Pauai: *B. S. 82385 Quisumbing & Sulit, B. S. 31713 Santos* (K, P; PNH †, *lecto-typus H. cuming.* var. *parvifol.*), *B. S. 9107 Clemens.* Mt Tonglon: *F. B. 14407 Darling.* "Benguet", loco haud ind.: *Loher 4499, 4500, 5070, Vidal 2008, B. S. 5806 Ramos.* Bontoc: *Vidal 1692.* Mt Caua: *B. S. 37998 Ramos & Edaño.* Apayo: *B. S. 28067 Fenix.* Ilocos Sur, Lepanto: *F. B. 14499 Darling.* Isabella, S. Mariano: *B. S. 47003 Ramos & Edaño.* Nueva Vizcaya, Caballo Mt: *B. S. 13738 Loher.* Nueva Ecija: *Vidal 3619, 3620.* Tayabas (Quezon): *Vidal 535.* Mt Camatis: *PNH 4507, 5038 Alcasio & Edaño.* Lucban: *Elmer 7657, 7774.* Casiguran: *B. S. 45487 Ramos & Edaño.* Mt Dingalan: *B. S. 26532 Ramos & Edaño.* Mt Bananao, 1600 m: *F. B. 869 Klemme, B. S. 27918, 27954 Ocampo.* Infanta-Siniloan trail: *B. S. 29176 Ramos & Edaño.* Bataan, Mt Mariveles, 500—650 m: *F. B. 836, 1235, 1354, 2076, 3060 Borden, F. B. 2599, 2602 Meyer, F. B. 1510 Ahern's Coll., Williams 426, 617, 718, Whitford 118, 342.* Rizal: *F. B. Ahern's Coll. 2670, 3098.* S. Isidro: *B. S. 305 Ramos.* Balacbac: *B. S. 14988 Loher.* Montalban: *Loher 6723, B. S. 12208 Loher.* Oriud: *Loher 6726.* Mt Angilog: *B. S. 42042 Lopez, Loher 6733.* Bosoboso: *Merrill 1849, 2635.* Laguna, Mt Banajao: *B. S. 27954 Ocampo.* Paete: *Sjoevall.* S. Antonio: *B. S. 20463 Ramos, Ramos 10912.* Batangas: *F. B. 28048 Mabesa, Cuming 1537* (G, *typus H. philippin.*; BM, K). Albay: *Cuming 1262* (B, BM, FI, G, K, MEL, P; PR, *typus H. cumingian.*, haud vidi). Sorsogon, Mt Bulusan: *Elmer 16444.* Mt Kililibong: *B. S. 23320 Ramos* (BM, K; PNH †, *typus H. oligophleb.*). Lake Polog: *B. S. 23632 Ramos.* "Luzon", loco haud indicato: *Loher 6740, Vidal 2136a.* Catanduanes. 600 m: *B. S. 75332 Ramos & Edaño, B. S. 30525 Ramos.* Mindoro: *B. S. 8723 Merritt.* Pinamalayan: *B. S. 40952, 41115, 41117 Ramos.* Mt Halcon: *B. S. 40659 Ramos & Edaño.* Cabesa River, Calapan: *PNH 19467 Britton.* Samar. Mt Calbiga: *PNH 6461 Sulit.* Catubig River: *B. S. 24408 Ramos.* Leyte: *Wenzel 629, 1020.* Antilao River: *PNH 11856 Edaño.* Abuyog, 300 m: *B. S. 31128 Fontanoza.* Mt Abucayan: *B. S. 41786 Edaño.* Biliran: *B. S. 18552 Mc Gregor.* Mt Suiro, 315 m: *PNH 21668 Sulit.* Negros. Mt Canlaon, 1960 m: *PNH 21949, 21961 Edaño.* Mindanao. Surigao: *Wenzel 2958.* Misamis, Mt Malindang: *F. B. 4700 Mearns & Hutchinson.* Cagayan: *F. B. 28879 Cenarbre & Agelar.* Bukidnon, Mt Katanglad, 1800 m: *PNH 9953 Sulit.* Tangkulan: *B. S. 39116 Ramos & Edaño.* Davao, Mt Apo: *Elmer 11581.* Mt Mayo: *B. S. 49382 Ramos & Edaño.* Lanao, Camp Keithley, Lake Lanao: *Clemens 558.*

H. robusta is understood here in a wide sense, including *H. cumingiana, H. philippinensis* and *H. oligophlebia,* which have the leaf-base ± acutely cuneate into the petiole, whilst "typical" *H. robusta* has the leaf-base truncate or at least obtuse, sometimes subcordate. But forms with the cuneate leaf-base occasionally are found on Java and the Malay Peninsula also, and some of the Philippine specimens of *H. robusta* have obtuse leaf-bases quite as has the type-specimen. There seem no other differences to exist in the flowers or fruits between the West Malaysian and the Philippine material of *H. robusta.*

65a. var. **integrifolia** (Elm.) Sleum. stat. nov. — *H. integrifolia* Elm., Leafl. Philip. Bot. 8, March 1915, 2798; Merr., En. Philip. 2, 1923, 99. — *H. longiflora* Merr., Philip. J. Sc. 10, Sept. 1915, 300. — *H. integra* Merr., Philip. J. Sc. 10, Sept. 1915, 301; En. Philip. 2, 1923, 99.

A typo foliis integris saepius minoribus differt.

PHILIPPINES. Luzon: *Vidal 1141.* Mount. Prov., Benguet: *F. B. 29781 Valentin.* Baguio, road to Bontoc: *v. Steenis 17931.* Tayabas, Mt Banahao: *Whitford 982* (K; NY, *typus H. longifl.*). Bataan, Mt Mariveles: *Merrill 3767.* Rizal, Mt Susong-Delaga: *B. S. 29351 Ramos & Edaño.* Laguna: *F. B. 24136 Santos.* S. Antonio: *B. S. 15127 Ramos* (K; PNH †, *typus H. integ.*, haud vidi). Mindanao. Agusan, Mt Urdaneta:

Elmer 13392 (B, FI, BO, L, NY, P; PNH †, *typus H. integrif.*, haud vidi; U). Bukidnon, Mt Dumalucpihan: *B. S. 38994 Ramos & Edaño.* Mt. Candoon: *B. S. 38938 Ramos & Edaño.* Dinagat Isl.: *B. S. 83941 Ramos & Convocar.* Mindoro. Pinamalayan: *B. S. 41024 Ramos.*

H. integrifolia Elm., here reduced to the status of a variety, seems to represent forms of *H. robusta* with entire and mostly smaller leaves, occurring in the higher parts of the Philppines, not rarely found together with the serrate "typical" form.

A specimen which comes near *var. integrifolia* but is different in somewhat thicker leaves and other minor characters:

BORNEO. Br. N. Borneo. Mt Kinabalu, Marai Parai, open place, base of great wall, 3350 m: *J. & M. Clemens 55095.* Mentioned under *H. erratica* Hook. f. by Suessenguth in Heine, Fedde Rep. 54, 1951, 226, a species which does not occur in Borneo.

66. **H. hainanensis** Hayata, Ic. Pl. Formos. 9, 1920, 87; Groff, Ding & Groff, Lingn. Agr. Rev. 1, 1924, 75; Merr., Philip. J. Sc. 21, 1922, 494; Lingn. Sc. J. 5, 1927, 68; Kaneh. & Sasaki, Tr. Nat. Hist. Formos. 19, 1929, 367; Tanaka & Odash., J. Soc. Trop. Agr. 10, 1938, 364; Chun, Sunyatsenia 4, 1940, 183; Merr., J. Arn. Arb. 23, 1942, 159; Masam., Fl. Kainant. 1943, 63. — *H. brevipetiolata* Merr., J. Arn. Arb. 23, 1942, 160.

Frutex elatus vel arbor parva 3—8(—15) m alta, cortice griseo vel brunnescenti. *Ramuli* subteretes, in partibus recentissimis in sicco viridescentes, in partibus vetustioribus brunnei, glabri, striati, lenticellis nullis. *Folia* saepius approximata quasi verticillata, oblanceolata, rarius oblongo-obovata, apice sensim vel subcaudato-acuminata, apice ipso acuti- vel obtusiuscula, basin versus cuneata, basi ipsa breviter attenuata plerumque obtusa, sessilia vel subsessilia, chartacea vel tenuiter subcoriacea, in vivo viridia et lucida, subtus pallidiora, in sicco olivaceo-virescentia, supra manifeste, subtus parum vel haud nitentia, glabra, sat regulariter ± remote serrata (dentibus prorsus versis et ± uncinatis 0.5—1.5(—3) mm altis, 6—15(—20) mm distantibus, 12—20(—25) cm longa, 4—7(—8) cm lata, costa utrinque elevata, nervis lateralibus utroque latere 7—8 leviter curvato-ascendentibus, margine obscure anastomosantibus, supra parum, subtus distinctius elevatis, venis venulisque utrinque dense reticulatis minuteque prominulis; petiolus brevissimus plerumque vix 1—2 mm longus et crassus, rarius usque ad 5 mm longus. *Racemi* axillares solitarii sat densiflori, cum pedunculo c. 2 cm longo 12—18(—20) cm longi, omnino glabri. *Rhachis* subangulata, in sicco virescens, 1—1.5 mm diam. *Bracteae* anguste ovatae, acutissimae, 1—1.5 mm longae. *Pedicelli* sat graciles plerumque bini, basi tantum connati, 3—4(—5) mm longi. *Perianthium* in vivo albidum vel flavescens, interdum rosaceum vel viridescens, (17—)21—22 mm longum, glabrum, tubo gracili 0.5—0.6 mm diam., limbo ellipsoideo 2 mm longo et 1.5 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* late ovatae, obtusae, in inferiore parte connatae. *Ovarium* glabrum. *Fructus* immaturus anguste ellipsoideus, rostratus, maturus ovoideo-ellipsoideus, apice breviter abrupte apiculatus, basi haud vel brevissime contractus, in vivo flavidus, griseo-brunneo-furfuraceus, 3—3.8 cm longus, 2.2—2.5 cm diam., pericarpio tenuiter coriaceo vix 1 mm crasso, pedicello 4—5 mm longo, 2—3 mm crasso.

INDOCHINA. Tonkin. Sontoy, Mt Bavi: *Pételot 2619, 2628* (A, *typus H. brevipetiol.*). Phu-tho: *Eberhardt 5066.* Hoa Binh: *Eberhardt 4129.* Annam. Vinh, Rés.

forest. de Có Ba: *Fleury* (Herb. *Chevalier 32373*). Thua-thien,, haut cours du Bogiang: *Eberhardt 2685, 2821.*

CHINA. Kwangsi. Tonkin-Kwangsi border, Kung Mu Shan: *Liang 67430*, cit. Chun, haud vidi, *Soo 68175*, cit. Chun, haud vidi. S. Nanning: *Ching 7867, 8192.* Kwangtung. Tung Sing: *Tsoong 1897*, cit. Merr. l. c. 494, haud vidi. Kanton: *d'Alleizette.* Hainan, 300—1000 m: *McClure 8069, 8385, 8429, 9206, 9563, 9716, Konishi* (TI?, *typus H. hainan,* haud vidi), *Lei 106, Tsang & Fung L. U. 17806, 18185, Tsang 590, 887, Chun & Tso 43800, 44331, Liang 62795, Wang 34549, 35208, 36148, Gressitt 854, How 71730, 72404, 73370.*

67. H. grandifolia Lec., Not. Syst. 1, May 1910, 189; Fl. Gén. Indo-Chine 5, 1914, 164, fig. 14 (1—4).

Arbor 8—10 m. *Ramuli* subteretes glabri. *Folia* ampla, saepius subopposita, obovata vel obovato-spathulata, apice breviter acuminata, obtusa, basi cordata vel auriculata, subsessilia, supra in sicco saturate vel atrescentiviridia, nitida, subtus dilutiora castanea, subnitida, glabra, integra vel supra medium paucidentata (dentibus glandula terminatis 1—1.5 mm altis valde distantibus), 24—35 cm longa, 9—15 cm lata, costa crassa supra bene, subtus valde prominente, nervis lateralibus utroque latere 8—10 leviter curvatis, obscure inter sese anastomosantibus, supra vix, subtus bene prominentibus, venis venulisque utrinque dense prominulo-reticulatis; petiolus 2—4 mm longus, 3—4 mm crassus. *Racemi* axillares, 20—26(—30) cm longi, rigidiusculi, ad rhachidem sat laxe, ad pedicellos et perianthia subdense breviter adpresse rufo-pilosi. *Rhachis* paullo applanata, c. 2.5—3 mm diam. *Bracteae* ± anguste ovato-acutae, glabrescentes, c. 2 mm longae. *Pedicelli* 1—1.5 mm tantum longi, plerumque geminati, basi connati, crassiusculi. *Perianthium* in vivo flavum, c. 18 mm longum, tubo 0.8—1 mm diam., limbo late ellipsoideo-clavato c. 3 mm longo, 2—2.5 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* late oblongae, apice irregulariter retusae, liberae, approximatae, cupulam aemulantes. *Ovarium* glabrum, stylo gracili. *Fructus* incognitus.

INDOCHINA. Tonkin. Mt Bavi, vallée de Lankok: *Balansa 3805* (K; P, *typus*).

68. H. finis-terrae Lauterb., Bot. Jahrb. 50, 1913, 332.

Arborescens, ramulis teretibus glabris. *Folia* obovata vel late obovato-oblonga, apice late attenuata, apice ipso obtusa, basi breviter in petiolum cuneata manifesteque decurrentia, ± coriacea, in sicco brunnea, supra subnitida, subtus opaca, glabra, integra, margine subrevoluta, 30—36 cm longa, (12—)13—16 cm lata, costa utrinque distincte prominente, nervis lateralibus utroque latere 9—10 curvato-ascendentibus, praeter marginem ± excurrentibus vel obscure anastomosantibus, aliis pluribus brevioribus et minus distinctis intermixtis, omnibus supra parum, subtus bene prominentibus, venis venulisque utrinque dense reticulatis et prominulis; petiolus 5—7 mm longus, valde crassus et rugosus. *Racemi* e nodis defoliatis orti, breviter pedunculati, c. 22 cm longi, sat densiflori, ad rhachidem et pedicellos sparse pilis brevibus adpressis rufescentibus obsiti, ceterum glabri. *Rhachis* c. 2.5 mm crassa, teres, tuberculis numerosis minutissimis intructa. *Bracteae* minutae. *Pedicelli* gemini, basi connati, 3 mm longi. *Perianthium* 16—17 mm longum, tubo 0.6—0.7 mm diam., limbo ellipsoideo apice rotundato-obtuso 1.5—1.8 mm diam. *Antherae* c. 3 mm longae. *Glandulae hypogynae* subrotundato-truncatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. N E. New Guinea. Madang Distr., Finisterre Mts, c. 1200 m: *Schlechter 18162* (B, *typus*).

Similar, with somewhat smaller leaves, flowers not yet full-developed:
NEW GUINEA. N E. New Guineo. Sepik Distr.: *Ledermann 9605* (K).

69. H. attenuata (Jack) Bl., Ann. Sc. Nat. II, 1, 1834, 216; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 83; Meisn. in DC., Prodr. 14, 1856, 439; Miq., Fl. Ind. Bat. I, 1, 1858, 985; Hook. f. in Hook. f., Fl. Brit. Ind. 5, 1886, 190; Boerl., Handl. 3, 1, 1900, 151; K. & V., Bijdr. Booms. Java 5, 1900, 313; Hall. f., Meded. Rijksherb. 12, 1912, 23; Koord., Exk. Fl. Java 2, 1912, 154; Gamble, J. As. Soc. Beng. 75, ii, 1914, 341; Ridl., Fl. Mal. Pen. 3, 1924, 141; Burk. & Henders., Gard. Bull. Str. Settl. 3, 1925, 417; Henders., Gard. Bull. Str. Settl. 4, 1928, 314; Merr., J. Arn. Arb. 33, 1952, 243; Back., Bekn. Fl. Java em. ed. IV A, 1942, fam. 79, p. 6. — *Roupala attenuata* Jack, Mal. Misc. 1, 1820, 10 *(Rhopala)*, reimpr. Hook. Bot. Misc. 2, 1830, 65; Walp., Ann. 1, 1848/49, 592. — *R. moluccana* (nec R. Br., nec Jack) Roxb., Hort. Beng. 1814, 83, nom. nud.; Fl. Ind. ed. Carey & Wall. 1, 1820, 364; R. & S., Mant. 3, 1827, 284; Roxb., Fl. Ind. ed. Carey 1832, 361. — *H. obovata* Benn. in Benn. & R. Br., Pl. Jav. Rar. 1838, 83; Meisn. in DC., Prodr. 14, 1856, 440, incl. var. *minor* Meisn. l. c.; Miq., Fl. Ind. Bat. I, 1, 1858, 985; K. & V., Bijdr. Booms. Java 5, 1900, 311; Koord., Nat. Tijd. Ned. Ind. 62, 1902, 226 incl. var. *connata* K. & V.; la. c. 63, 1904, 39. — *H. oblongifolia* Benn. in Benn. & R. Br., Pl. Jav. Rar. 1838, 83; Meisn. in DC., Prodr. 14, 1856, 438; Miq., Fl. Ind. Bat. I, 1, 1858, 983 incl. var. *subpetiolata* Miq. l. c. 984; Suppl. 1, 1860, 148; K. & V., Bijdr. Booms. Java 5, 1900, 310. — *H. bennettiana* Miq., Fl. Ind. Bat. I, 1, 1858, 984; K. & V.,Bijdr. Booms. Java 5, 1900, 309; Koord., Exk. Fl. Java 2, 1912, 155; Back., Bekn. Fl. Java em. ed. IV A, 1942, fam. 79, p. 7. — *H. sumatrana* Miq., Fl. Ind. Bat. Suppl. I, 1860, 148, 1861, 364. — *Finschia sumatrana* Miq. ex Boerl., Handl. 3, 1, 1900, 151 (sphalm. pro *Helicia sumatrana*). — *H. suffruticosa* Ridl., J. Fed. Mal. Stat. Mus. 6, 1915, 171; Fl. Mal. Pen. 3, 1924, 141. — *H. lanceolata* (non K. & V.) Bak. f., J. Bot. 63, 1925, Suppl. 89. — *H. kingiana* (non Prain) Merr., Pap. Mich. Acad. Sc. 24, 1939, 67.

Frutex (1—)3—5 m altus vel arbor mediocris, raro 20 m alt. attingens, cortice sat laevi cinereo-brunnescenti minute longitudinaliter fisso. *Rami* divaricati. *Ramuli* glabri, pallide brunnei, laeves, nitiduli, longitudinaliter striati. *Folia* oblonga vel elliptico-oblonga, interdum oblongo-lanceolata rarius fere obovata, apice gradatim attenuata et subacuta, apice extremo obtusiuscula, basi attenuata, basi ipsa subacuta usque obtusata rarius subcordato-truncata, ± in petiolum decurrentia, firmule chartacea vel subcoriacea, in vivo supra saturate viridia et lucida, subtus dilutiora et ± opaca, caeruleo-reflectentia, in sicco virescentia, olivaceo-flavescentia vel dilute brunnea, recentissima interdum rubescenti-brunnea, supra nitentia, subtus subopaca, integra vel remote denticulata, interdum imprimis antice sat grosse repando-serrata, 9—25(—30) cm longa, (3—)5—8(—11, raro usque ad 17) cm lata, costa utrinque prominente, nervis lateralibus utroque latere 7—9(—10) alte curvato-ascendentibus, ante marginem distincte anastomosantibus, supra parum prominentibus vel in sicco saepius leviter impressis, subtus manifeste elevatis, venis venulisque plerumque sat dense reticulatis utrinque parum manifeste prominulis, interdum subinconspicuis; petiolus 2—10 mm longus, basi valde incrassatus et rugosus. *Racemi* solitarii axillares vel ad nodos defoliatos instructi, fere usque ad basin densiflori, 12—25(—30) cm longi, initio erectiusculi deinde horizontaliter patuli. *Rhachis* teretiuscula, in sicco viridescens vel rubescens, glabra vel sicut pedicelli laxissime pilis adpressis rufescentibus brevibus obsita, 1.5—2.5 mm diam. *Bracteae* ovato-subulatae, minutissimae, vix 1 mm longae. *Pedicelli* plerumque bini, in vivo caerulescentes, basi vel usque ad $^{1}/_{4}$ long. connati, crassiusculi, sub anthesi 4—5 mm longi. *Perianthium* albescens vel flavescens, interdum viridescenti-flavescens, odoratum, (20—)25—28 mm longum, glabrum, tubo 0.5—0.6 mm diam., limbo ellipsoideo c. 1.5 mm diam. *Antherae* c. 2.5 mm longae. *Glandulae hypogynae* subtruncatae, fere omnino in urceolum crenulatum connatae. *Ovarium* elongato-ovoideum, basi ipsa attenuatum, glabrum, stylo filiformi. *Fructus* in vivo caerulescenti-viridis denique purpureo-atrescens, late ellipticus vel ovoideus, subinaequilateralis, breviter apiculatus, basi late attenuatus vel manifestius in pedem brevem contractus, costis c. 6 ± manifestis longitudinalibus subangulatus, 3—4(—5) cm longus, (2—)2.5—3 cm diam., pericarpio coriaceo ± 2 mm crasso, pedicello 4—5 mm longo, c. 2.5 mm crasso.

SIAM. Payap, Ban Wo, Toh Moh (Doi-Sutep), c. 180 m: *Kerr 693* (BM), shrub near stream in evergreen forest, fl. yellow. Puket, Tasan: *B. Kloss 6928* (K), fr.

MALAY PENINSULA. Penang: *Jack*, Herb. *Wallich 1040, 1* (BM; K, *typus H. atten.*). Telong (Tulloh) Bahang: *Curtis 1181, Ridley 12683.* Waterfall: *Curtis 2765, Nur.* Kedah. Langkawi: *For. Dep. F.M.S. 20759.* Perak. Kelan Tujor, 150 m: *Wray 4052.* Parit For. Res.: *For. Dep. F.M.S. 12027, 34285.* Larut: *Kunstler 3383.* Batu Togo, 60 m: *Henderson SF 10210.* Taiping, 450—600 m: *Kunstler 8496.* Goping, 100 m: *Kunstler 5931.* Ulu Kerling, 150—250 m: *Kunstler 8795.* Banks of Kinta River: *Kunstler 764.* Loco haud indicato: *Wray 2159, 2671, 3144, 3156, Scortechini 195, Kunstler 4301, 4594, 8496.* Kelantan. B. Batu Papan, S. Lebir: *Henderson SF 29561.* Pahang. G. Tahan, Teku Woods: *Ridley 16126* (K, *typus H. suffruticos.*; SING); ibid., c. 1370 m: *Holttum SF 20743.* Telom: *Ridley.* Cameron Highlands, c. 1460 m: *Henderson SF 23277*; ibid., Boh Plant. c. 1200 m: *Nur SF 32617, Batten Pooll.* Lubok Tamang, Bertam River, c. 1060 m: *Henderson SF 11104.* Bintong: *Burkill & Haniff SF 16684.* S. Pertang, Ulu Tembeling: *Henderson SF 22045.* B. Batu Berandam, P. Tioman: *Nur SF 21752.* S. Cheka: *Holttum SF 24761.* Ulu Serau: *For. Dep. F.M.S. 27996.* Selangor. Kuala Lumpur: *Curtis 2372, For. Dep. F.M.S. 15232.* Dusun Tua Kajang: *Ridley, For. Dep. F.M.S. 16966.* Kepang Plant.: *For. Dep. F.M.S. 44916.* Ginting Sempak: *For. Dep. F.M.S. 12114.* Ulu Gombak: *For. Dep. F.M.S. 16988 Symington.* S. Buloh For. Res.: *For. Dep. F.M.S.. 13933 Strugnell.* Klang Gates: *Hume 7251a.* Lower Ampang Res. *For. Dep. F.M.S. 13367.* Malacca. S. Ujong: *Alvins 3301.* Johore. Mt. Austin: *Ridley 13008.* S. Pelepah, 60 m: *Nur SF 20001.* S. Tebrau: *Ridley 13224.* Kota Tinggi-Jemaluang: *Sinclair SF 40294.*

SUMATRA. E. Coast. Asahan: *Rahmat Si Boeea 6445, 6610, 6828, 7437, 7562, 7637, 8134, 9516, Yates 1191, 1593, Bartlett 7385, 8064.* Kualu: *Bartlettt 7116, 7598.* Sibolangit, 80—500 m: *Lörzing 5685, 9692*; ibid., 1100 m: *Galungi 337.* Labuhan Batu: *Toroes 3965.* G. Singgalang: *Bünnemeijer 2622.* Tapanuli: *Toroe 4691, 4746, 5092, 5294.* Palembang. Ipil, Batang Leko (Harileko): *Teysmann H.B. 3934* (BO, L; U, *typus H. sumatran.*). W. Coast. Fort de Kock: *Yates 2510.* Lampung: *Zollinger 1594* (P, *typus H. oblong.* var. *subpetiol.*). G. Tanggamus, 1000 m: *de Voogd 177.* Loco haud indicato: *Korthals.*

JAVA. Bantam. G. Karang, 600—1000 m: *v. Hasselt, Koorders 6251, 40109, 40622.* Kosala, Pasir Orai, 700 m: *Forbes 465.* Tjibadui, c. 600 m: *Forbes 80.* Preanger. Tjisalak: *Koorders 38962.* Pangentjongan, 1300—1600 m: *Koorders 6249, 6256, 13831, 13878, 13901, 13953, 26619.* G. Masigit, 1650 m: *Backer 12410.* Pangerango, 1000 m: *Bakhuizen v. d. Br. 2075.* G. Salak, 600—1000 m: *Zollinger 3023 pr. p., Koorders 24358.* Sukabumi, 650 m: *Koorders 38962.* G. Beser, S. of Bandung: *Bak-*

huizen v. d. Br. 2801. Loco haud indicato: *Forbes 1921.* Banjumas. Pringombo: *Koorders 6274, 12198, 33859, 39070.* Madjenang, G. Tjendana, 700 m: *Backer 18657.* Pekalongan. Surdjo, 800—1400 m: *Koorders 6257, 6271, 6272, 11236.* G. Prau, 1600—1750 m: *Loogen, Lörzing 608.* Kedu. G. Merbabu, 1000—2000 m: *Büsgen 161.* G. Sindoro, 1200—1800 m: *Blokhuis 49, Koorders 6266, 11338, 36632.* Semarang. Telemojo, 1200 m: *Koorders 6265, 27901, 27902, 39230, Coert 1628.* Ungaran, c. 1200 m: *Junghuhn, Doct. v. Leeuwen.* Salatiga, 1500 m: *FRI Ja. 2478.* Djokja. G. Plawangan, 750 m: *Beumée A 106.* Madiun. Ngebel: *Koorders 6262, 6275, 6276, 29355, 38693.* G. Lawu, 1500—2650 m: *Coert, Elbert 227, Dorgelo S 438.* Pasuruan. Probolinggo, Tengger, 1650 m: *Ridley, Kobus, Koorders 37908* (BO, *typus H. obovat.* var. *connat.*). G. Tarub, 1250—1300 m: *Dillewijn 543, v. Steenis 10718.* G. Widodaren, 1700 m: *Backer 3669.* G. Dorowati, 1450 m: *Backer & Posthumus.* Djungo, 1200 m: *v. Steenis 2529.* Kediri. G. Wilis, 1200 m: *Lörzing 836.* Ngandjuk, 1100 m: *FRI Ja. 3014.* Besuki. Semeru, 1200—1800 m: *Zollinger 597* (= 2599, BM; G, *typus H. obovat.* var. *minor*; P). Loco haud indicato: *Horsfield* (BM, K; U, *typus H. benettian.*), *Horsfield* (BM, *typus H. oblongifol.*; K), *Horsfield* (BM, *typus H. obovat.*; K), *Hoffmannsegg, Leschenault.*

BALI. G. Pala, 525 m: *Sarip 255.* G. Patas, 945 m: *Sarip 470.*

BORNEO. Br. N. Borneo. Mt Kinabalu, Dallas, c. 1000 m: *J. & M. Clemens 27286*; ibid., below Kalawat near Kappok, 600 m: *J. & M. Clemens 51609*; ibid., near Bundu Tuhau, c. 1000 m: *Carr SF 27786.* Tuaran, E of Tamparuli, c. 1000 m: *Br. N.B. For. Dep. San A 4529.* Tawao: *Elmer 21539, 21817.* Tambunan, 760—880 m: *Br. N.B. For. Dep. A 3627, A 4446.* Sandakan, Kabili-Sepilok For. Res.: *Castro 4432, Br. N.B. For. Dep. 38808.* Sarawak. G. Pua: *Igon 456.* C. E. Borneo. Lelebulan: *Jaheri 873.* Ulu Bluu: *Amdjah 281.* Sg. Brunei (c. 1°—115°): *Jaheri 1092.* E. Borneo. Bulongan, pr. fl. Sadjan: *Rutten 93.* S E. Borneo. P. Tjahu, 200 m: *NIFS bb. 11097.* W. Kutei, near Mt Kemul, 1500 m: *Endert 3911.* G. Sakumbang: *Korthals.*

Sterile, similar in leaf-characters, possibly conspecific:

CELEBES. C. Celebes. Tapalang, N of Madjene: *Noerkas 438.*

Specimens identical with the type-specimen, i. e. with rather thin leaves and an ± acute leaf-base, occur in Siam, the Malay Peninsula, Sumatra, Java and Borneo, whilst forms with thicker leaves and an obtuse, truncate or subcordate leaf-base up to date have been found only once in Sumatra (Sibolangit), but are rather frequent in Java and Borneo, exclusively so in Bali. It seems impossible to maintain this second form, described as *H. obovata*, *H. oblongifolia* and *H. bennettiana*, as a species or merely as a variety, because it is connected with the typical form by many intergrades, specially in Java. Although the extreme forms of *H. attenuata* seem to be rather distinct from each other, they show no differences in flowers or fruits.

70. H. bullata Sleum. sp. nov.

Arbor c. 8 m alta, ramulis novellis c. 3 mm crassis saturate ferrugineo-tomentosis, vetustioribus subdense pilosis brunnescentibus. *Folia* elliptica vel obovato-elliptica, apice late attenuata, subacuminata vel saepius obtusa usque rotundata, basi in petiolum cuneata, haud decurrentia, interdum paullo inaequilateralia, subcoriacea, in sicco viridescenti-flavida, juniora supra ad costam et nervos, subtus per totam faciem pilis rufis elongatis crispulis subdense aequaliter obtecta, ad costam densius tomentosa, matura supra glabra et nitida, subtus ad costam et nervos tantum manifestius pilosa, in facie ± glabrescentia, costa supra bene, subtus valde prominente, nervis lateralibus utroque latere 8—12, infimis paucis ± rectis, superioribus ± curvatis ante marginem ± distincte inter sese anastomosantibus, aliis intercalaribus paucis brevioribus, omnibus in foliis nondum plane

maturis supra parce, in foliis maturis valde manifeste cum rete venarum sat denso impressis, subtus prominentibus, venulis supra minus profunde sed distincte immersis, subtus parum elevatis; petiolus validus diutius tomentosus, demum subglabrescens et rugosus, 1.2—1.8 cm longus, ± 2.5 mm crassus, basi valde incrassatus. *Racemi* e ramulis, ut videtur, vetustioribus orti, solitarii vel bini, erecti, rigidiusculi, usque ad basin densissime florigeri, 9—10 cm longi, ubique tomento ferrugineo sat denso et ± adpresso obtecti. *Rhachis* basi 3 mm crassa. *Bracteae* ovato-acuminatae, 1 mm longae. *Pedicelli* crassiusculi, plerumque gemini et in inferiore tertio connati, sub anthesi 4—5 mm longi. *Perianthium* in vivo albidum, c. 16 mm longum, basi inflatum, tubo 1 mm diam., limbo clavato subacuto 1.8 mm diam. *Antherae* 3.5 mm longae. *Glandulae hypogynae* ovato-oblongae, retusae, liberae, approximatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. Papua. West. Highl., Nondugl: *N. G. F. 4368 Womersley* (K, *typus*; L, LAE), fl. 4—51.

71. H. insculpta Sleum., Bot. Jahrb. 70, 1939, 141.

Frutex vel arbuscula 2—6 m alta, ramulis crassis, novellis dense pilis crispulis ferrugineis obtectis, cito glabratis, denique griseo-corticatis, apicibus folia subcomose gerentibus. *Folia* late oblonga vel elliptica rarius oblonga, apice late acuminata, obtusa, basi late cuneata vel fere rotundata, subcoriacea, novella utrinque pilis crispulis subadpressis dilute ferrugineis subdense obtecta, citissime costa subtus basi brevissime pilosa excepta glabrescentia, regulariter dentata (dentibus glanduloso-incrassatis obtusiusculis 6—9 mm distantibus, c. 1 mm altis), 6.5—8(—10) cm longa, 3.5—4.5(—5) cm lata, costa supra parum prominente vel leviter impressa, subtus valde prominente, nervis lateralibus utroque latere c. 7 arcuatis, margine inter sese conjunctis, supra distincte impressis, subtus bene prominentibus, venis laxe reticulatis supra parum immersis, subtus elevatis, venulis subinconspicuis; petiolus crassiusculus, ± dense ferrugineo-pubescens, 5—6 mm longus. *Racemi* e ramulis defoliatis orti, densiflori, rigidiusculi, 6—8 cm longi. *Rhachis* dense rufo-pilosa, c. 2.5 mm diam. *Bracteae* ovato-acuminatae, glabrescentes, 2—2.5 mm longae. *Pedicelli* plerumque gemini, basi connati, laxe rufo-pilosi, 2.5—3 mm longi. *Perianthium* in vivo rubrum vel rosaceum, ante anthesin sat dense, sub anthesi laxe usque laxissime pilis rufescentibus adpressis indutum, c. 30 mm longum, tubo 0.7 mm diam., limbo clavato 2.5 mm diam. *Antherae* 2.5—3 mm longae. *Glandulae hypogynae* in annulum 1 mm altum connatae. *Ovarium* glabrum, stylo crassiusculo apice fusiformi. *Fructus* ignotus.

NEW GUINEA. Papua. Centr. Distr., Mt Victoria, above "The Gap", c. 2440 m: *Carr 13744* (B, *typus*; BM, K, L, NY, SING), *15236*. Owen Stanley Range, c. 2800 m: *McGregor*.

72. H. silvicola W. W. Smith, Not. Edinb. Bot. Gard. 10, 1918, 181.

Arbor parva, usque ad 6 m alta. *Ramuli* novelli ± dense subpatenter rufo-tomentosuli, vetustiores glabrescentes. *Folia* oblanceolata, apice sensim vel subcaudato-acuminata, acutiuscula, basi ± longe in petiolum attenuata, in superiore petioli parte tantum decurrentia, firmule chartacea usque subcoriacea, in sicco supra brunnescenti-viridia, subtus saturate castanea, utrinque opaca et costa ± patenter ferrugineo-tomentella excepta glabra, demum omnino glabrescentia, regulariter serrata vel serrulata, dentibus prorsus versis glandula terminatis subacutis 0.5—1 mm altis, superne 3—6 mm, deorsum magis distantibus), 15—25 cm longa, 3—6 cm lata, costa utrinque imprimis subtus elevata, nervis lateralibus utroque latere 10—12(—14) curvatis inter sese subparallelis et parum distincte anastomosantibus, supra parum, subtus manifestius prominulis, venis venulisque sat laxe reticulatis supra parum vel vix, subtus minute prominulis; petiolus rufo-tomentosus, (1.5—)2—2.5 cm longus. *Racemi* axillares fere ad basin densiflori, suberecti, 12—17 cm longi. *Rhachis* subpatenter rufo-crispulo-tomentosa, c. 2 mm diam. *Bracteae* ovato-lanceolatae vel lineares, acutae, subpersistentes 2(—3) mm longae, rufo-pilosae. *Pedicelli* plerumque bini, basi connati, subgraciles, sat dense rufo-pilosae, tarde glabrescentes, 3—4 mm longi. *Perianthium* in vivo pallide flavidum, 11—12 mm longum, extus glabrum, tubo gracili c. 0.5 mm diam., limbo ellipsoideo 1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* oblongo-ovatae, liberae, approximatae, basi paullo cohaerentes. *Ovarium* glabrum. *Fructus* ignotus.

CHINA. Yunnan. Szemao, c. 1980 m: *Henry 13075* (A, B; E, *typus*; FI, K, L, NY).

73. **H. pyrrhobotrya** Kurz, J. As. Soc. Beng. 43, ii, 1873, 103; Prel. Rep. For. Veg. Pegu 1875, 74; For. Fl. Br. Burma 2, 1877, 312; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 191.

Arbor parva 3—6 m alta, ramulis novellis rufo-tomentosis, vetustioribus tarde glabrescentibus rigidis, nodulosis, vestigiis foliorum delapsorum magnis subrotundatis. *Folia* ampla, oblonga-obovato vel plerumque oblanceolata, ad apices ramulorum conferta, subcoriacea, apice sat abrupte et breviter acuminata, acuta rarius subobtusa, basin versus ± longe cuneata, basi ipsa acuta vel obtusa, in superiore petioli parte ± decurrentia, in sicco supra flavido-olivacea, subnitida, subtus dilute brunnea et opaca, adulta costa diutius tomentosa excepta glabra, subtus laxissime minute adpresse rufescenti-pilosula, sat dense subregulariter argute serrata (dentibus prorsus versis 1—2 mm altis et 4—8(—15) mm distantibus, glandula terminatis), 20—30(—45) cm longa, (6—)7—12(—16) cm lata, costa utrinque prominente, subtus valde crassa, nervis lateralibus utroque latere c. 14 leviter arcuatis, inter sese ± parallelis, prope marginem parum distincte anastomosantibus, supra fere planis vel levissime immersis, subtus prominentibus, venis venulisque subdense reticulatis utrinque obscure prominulis; petiolus valde crassus 1—3 cm longus, 2.5—3 mm crassus, initio rufo-tomentosus, deinde glabrescens. *Racemi* e ramulis defoliatis orti, robusti, ± penduli, pedunculo 2—3 cm longo incl. 20—30 cm longi. *Rhachis* subteres, laxe usque sat dense subpatenter rufo-pilosa, sub anthesi 2.5—3 mm crassa. *Bracteae* subovato-lanceolatae, 1—1.5 (rarius —3) mm longae, patenter tomentosae, ± persistentes. *Pedicelli* (2—)3—4 mm longi, crassiusculi, plerumque gemini, basi vel usque ad medium connati, subdense rufo-pilosi. *Perianthium* in vivo albidum vel flavescens, laxe adpresse rufo-ferrugineopilosum, 18—23 mm longum, tubo 0.8—1 mm diam., limbo subclavato-ellipsoideo c. 2 mm diam. *Antherae* 3 mm longae. *Glandulae hypogynae* truncatae, in annulum crenatum connatae. *Ovarium* glabrum. *Fructus* oblique subglobosus, brunneo-furfurascens, rugosulus, apice breviter apiculatus, basi in stipitem 2—3 mm longum contractus, 2—2.5 cm diam., pericarpio 2.5 mm crasso, pedicello 10 mm longo, 2 mm crasso.

BURMA. Lower Burma. Martaban Hills, between Sittang and Salween watershed, c. 1200 m: *Brandis 1408* (CAL; K, *typus*). Pegu, Karen hills: *Kurz 3123*. Kowpok, Salween: *Meebold 16703* (CAL). Thayet Ch. Chg.: *Kurz 987bis*. Meeplay: *Brandis 1380*. Amherst Distr., Dawna Range, c. 1000 m: *Lace 5656*. Tenasserim, Jaepo, 1500 m: *Gallatly 546*.

CHINA. Yunnan. Szemao, SE. forest, c. 1200—1800 m: *Henry 12808*.

74. H. petelotii Merr., J. Arn. Arb. 19, 1938, 24.

Arbor c. 10 m alta, ramulis crassis apicibus saturate rufo-tomentosis, deorsum glabratis. *Folia* oblanceolata vel elongato-oblongo-obovata, apice breviter acuminata, subacuta vel obtusa, basin versus longe cuneata, basi ipsa breviter in petiolum attenuata vel sat abrupte obtusata, in petiolo parum vel haud decurrentia, subcoriacea vel coriacea, in sicco supra virescenti-olivacea vel dilute castanea et nitentia, subtus brunnea et subopaca, sat regulariter remoteque serrata (dentibus prorsus versis subuncinatis glandula terminatis c. 1—1.5 mm altis, 6—10(—15) mm distantibus), rarius subintegra, supra glabra, subtus secus costam diutius rufo-tomentosula, in facie passim pilis rufescentibus minutis adpressis vestita, 30—40 cm longa, 10—13 cm lata, costa utrinque prominente, subtus validissima, nervis lateralibus utroque latere 12—15(—20) curvatis praeter marginem excurrentibus, supra planis vel paullo elevatis, subtus prominentibus, venis venulisque utrinque sat dense reticulatis et prominulis; petiolus crassus, (1—)1.5—2 cm longus, diutius rufo-tomentosus. *Racemi* e trunco e ramulis defoliatis orti, ut videtur ascendentes, fere usque ad basin sat densiflori, 30—40 cm longi. *Rhachis* sicut pedicelli rufo-ferrugineo-tomentosula, subteres, rigida, 2.5—3 mm diam. *Bracteae* lanceolatae, pilosae, subpersistentes, 2 mm longae. *Pedicelli* robusti, plerumque bini, basi connati, 6—8 mm longi. *Perianthium* (in vivo albidum?) laxe usque subdense subadpresse rufo-ferrugineo-pilosum, 30—35 mm longum, tubo 1—1.2 mm diam., limbo elongato-ellipsoideo 2.5—3 mm diam. *Antherae* 3.5 mm longae. *Glandulae hypogynae* in cupulam crenatum connatae. *Ovarium* glabrum. *Fructus* ignotus.

INDOCHINA. Tonkin. Chapa, slope west of the first ridge, Massif du Fan Tre Pan, c. 1400 m: *Pételot 5721* (A, *typus*). Chapa, 1500 m: *Pételot 4791*.

75. H. hypoglauca Diels, Bot. Jahrb. 54, 1916, 202; Sleum., l.c. 70, 1939, 142.

Arbor 20—25 m alta, gracilis, fusco-corticata. *Ramuli* novelli rufo-ferrugineo-tomentosi, vetustiores plerumque mox glabrescentes, teretes. *Folia* (lanceolato-)oblonga, apice breviter (1—2 cm) acuminata, subacuta, basi in petiolum attenuata, in superiore tertio petioli parum manifeste decurrentia, subcoriacea, in vivo supra viridia et lucida, subtus glabrescentia, in sicco pallide olivaceo-virescentia usque flavescentia, supra nitidula, subtus ± opaca, novella subtus in facie rufo-ferrugineo-tomentosula cito glabrescentia, adulta subtus diutius ad costam, nervos et basin versus in facie ± laxe adpresse fusco-pilosa, denique omnino glabrescentia, integra vel rarissime hic inde denticulo 1 mm alto obsita, (6—)7—12(—15) cm longa, (2.5—)3.5—5.5 cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 6—7(—8) inferne subrectis marginem versus curvatis interque sesse conjunctis, subtus tantum prominulis, venis venulisque utrinque sat dense prominulo-reticulatis; petiolus gracilis, basi parum incrassatus, tarde glabrescens, 1.5—2.5(—3) cm longus. *Racemi* axillares vel e ramulis defoliatis orti, solitarii, interdum ad summas axillas haud foliigeras dispositi itaque paniculam terminalem praebentes, densiflori, 7—13(—15) cm longi, ubique sat dense adpresse ferrugineo- vel rufescenti-pilosi. *Rhachis* 1.5—2 mm diam. *Bracteae* ovato-lanceolatae, acutiusculae, 1 mm longae, plerumque cito caducae. *Pedicelli* sat graciles, sub anthesi 3—5 mm longi, plerumque bini et basi, rarius usque ad medium connati. *Perianthium* in vivo albido-flavescens vel flavidum, 17—18(—20) mm longum, tubo 0.8—1 mm diam., limbo ellipsoideo 2 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* late obovatae, truncatae, ± manifeste in cupulam connatae. *Ovarium* glabrum, stylo gracili. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Sepik Distr., "Pyramide", c. 400 m: *Ledermann 7594* (B, *typus*; K). Morobe Distr., Sattelberg, c. 1000 m: *Clemens*. Wareo, c. 600 m: *Clemens 1398*. Yunzaing, 1370—1520 m: *Clemens 3999, 4066, 6471*. Sambanga, 1500—1800 m: *Clemens 7695*. Samanzing, 1800—2130 m: *Clemens 9433*. Matap, 1500—1800 m: *Clemens 11261*. Boana, 1200—1500 m: *Clemens 8595*.

The hairs in the type-material are somewhat crisp, but in the specimens from the Sattelberg region manifestly appressed.

76. **H. albiflora** Sleum., Bot. Jahrb. 70, 1939, 138.

Arbor c. 12 m alta, ramulis novellis adpresse saturate fusco-tomentosulis, vetustioribus subteretibus glabris. *Folia* oblonga, late obtuse attenuata, basi late attenuata usque subrotundata, in superiore petioli parte paullo decurrentia, in sicco olivaceo-castanea vel saturate castanea, supra nitidula, subtus opaca et pallidiora, novella subtus rufo-pubescentia, adulta glabra vel subtus ad costam et nervos pilis solitariis passim induta, integra, (12—)15—17 cm longa, 5.5—7(—8) cm lata, costa supra parum, subtus manifeste prominente, nervis lateralibus utroque latere 8—9 supra parum, subtus distincte prominentibus, curvatis et conspicue anastomosantibus, venis venulisque dense reticulatis utrinque parum, sed bene visibiliter prominulis; petiolus ± dense adpresse rufo-pilosus, tarde glabrescens, 1.5—2 cm longus, basi ima incrassatus. *Racemi* ex axillis defoliatis enascentes, solitarii, 10—12 cm longi, ad rhachidem et pedicellos sat dense breviter adpresse rufo-pilosi. *Rhachis* 2—2.5 mm diam. *Bracteae* lanceolatae, acutae, 1—1.5 mm longae. *Pedicelli* crassiusculi, plerumque bini et basi connati, c. 3 mm longi. *Perianthium* in vivo albidum, laxe pilis sublongis rufis adpresse pilosum, 25 mm longum, tubo 0.8 mm diam., limbo 2 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* subquadratae, breves, connatae, cupulam crenulatam formantes. *Ovarium* glabrum, stylo crassiusculo. *Fructus* deest.

NEW GUINEA. Papua. Centr. Distr., Isuarava, c. 1200 m: *Carr 15473* (B, *typus*; BM, K, NY, SING); ibid., c. 1370 m: *Carr 15493*.

77. **H. petiolaris** Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 84; Meisn. in DC., Prodr. 14, 1856, 438; Miq., Fl. Ind. Bat. I, 1, 1858, 983; Hook. f. in Hook. f. Fl., Br. Ind. 5, 1886, 190; Boerl., Handl. 3, 1, 1900, 151; Ridl., J. Str. Br. R. As. Soc. 33, 1900, 132; Agric. Bull. Straits & F. M. S. 1, 1902, 248; Gamble, J. As. Soc. Beng. 75, ii, 1914, 342; Merr., En. Born. Pl. 1921, 235; Fl. Mal. Pen. 3, 1924, 141; Henders., Gard. Bull. Str. Settl. 4, 1928, 314; Burk., Dict. 1935, 1134. — *Roupala moluccana* (non R. Br., non Roxb.) Jack, Mal. Misc. 1, 1820, 10 (*Rhopala*), reimpr. Hook. Bot. Misc. 2, 1830, 65; R. & S., Mant. 3, 1827, 284. — *H. attenuata* (non

[Jack] Bl.) Ridl., J. F. M. Stat. Mus. 7 (1916) 49. — *H. erratica* (non Hook. f.) Suesseng. in Heine, Fedde Rep. 54, 1951, 226 pr. p.

Frutex c. 4 m altus vel arbor parva 8—12 (rarius usque ad 20) m alta. *Ramuli* crassi, in partibus novellis angulati, glabri, in partibus vetustioribus subteretes, cito griseo-corticati. *Folia* obovato vel oblongo-obovata, apice breviter late usque subcaudato-acuminata, apice ipso subacuta vel obtusa, interdum subrotundata, basi in petiolum cuneata paulloque decurrentia, rigide subcoriacea usque coriacea, in sicco supra saturate olivacea vel brunnea, nitida, subtus intense castanea, opaca, haud raro omnino nigrescentia, integra, glabra, (10—)14—22(—27) cm longa, (5—)6—10 (—13) cm lata, costa supra parum, subtus valde prominente, nervis lateralibus utroque latere 7—8 (interdum usque ad 10) curvatis praeter marginem conspicue inter sese anastomosantibus, aliis pluribus intercalaribus intermixtis, omnibus supra subimpressis vel plerumque parum, subtus semper manifeste prominentibus, venis venulisque subdense reticulatis utrinque parum, sed bene visibiliter elevatis; petiolus sat crassus, (1—)1.5—2.5 (—4) cm longus, basi valde incrassatus. *Racemi* axillares, patuli, usque ad basin densiflori, 15—25(—30) cm longi, in sicco nigrescentes. *Rhachis* in vivo purpurascens, sub anthesi 2.5(—3) mm crassa, subangulata, sicut pedicelli sparse pilis minutis adpressis obsita vel cito omnino glabrata. *Bracteae* anguste ovato-acuminatae vel subulatae, pilosulae, vix 1 mm longae, plerumque subpersistentes. *Pedicelli* crassiusculi, bini, basi ± alte connati, 5—6(—7) (rarius usque ad 10) mm longi. *Perianthium* in vivo albidum vel pallide viride, glabrum, crassiusculum, (18—)20—22 (rarius usque ad 25) mm longum, tubo robusto c. 1 mm diam., limbo elongato-ellipsoideo 2—2.5 mm diam. *Antherae* c. 3 mm longae. *Glandulae hypogynae* ovatae, obtusae, sub anthesi ± in cupulam crenulatam et interdum minutissime fimbriatam cohaerentes demum divergentes. *Ovarium* glabrum. *Fructus* subglobosus vel obovoideus vel depresso-globosus, (2—)2.5—3 cm longus, 2.5—3 cm crassus, apice subrotundatus vel brevissime obtuse apiculatus, basi late attenuatus vel paullo substipitato-contractus, demum in sulco unilaterali verticali manifesto hians, in vivo primo viridis, deinde caeruleo-purpureus, pericarpio coriaceo duro exsucco c. 2 mm crasso, pedicello 6—7 mm longo, 3 mm crasso.

MALAY PENINSULA. Penang: *Jack* in Herb. *Wallich 1041.1* (BM; K, *typus of H. petiol.*). Moniots Road: *Curtis*. Western Hill: *Haniff SF 9134*. Kedah. Kedah Peak, c. 1060 m: *Robinson & B. Kloss 6118*. Perak. Larut: *Kunstler 5438*. Ulu Kerling: *Kunstler 8687*. Goping, 150—250 m: *Kunstler 4641*. Thaiping: *Kunstler 8442*. Trolak For. Res.: *For. Dep. F. M. S. 43418*. Kelantan. G. Stong, c. 790 m: *For. Dep. F. M. S. 37635*. Selangor. Public Gardens Kuala Lumpur: *For. Dep. F. M. S. 15233*, *Goodenough 10472*. Johore. S. Sedili, Bagan Liman: *Corner SF 25965*. Singapore: *Wallich 1041.2*. Garden jungle: *Ahmad* Garden nr. *1219*, *Ridley 4695*. Sg. Buloh: *Ridley 3625b, 6257*. Changi Res.: *Ridley 4696*. Bukit Mandai: *Ridley 3625a*.

BORNEO. Br. N. Borneo. Mt Kinabalu, Dahobang River, c. 2130 m: *J. & M. Clemens 32914*, not typical; ibid., Penibukan Ridge, 1220 m: *J. & M. Clemens 40399*; ibid., Columbon River, 1800—2100 m: *J. & M. Clemens 33963*; ibid., Upper Kinataki River, c. 2100 m: *J. & M. Clemens 31865*; ibid., Dallas, c. 1000 m: *J. & M. Clemens 27586 (27636)*; ibid., below Kalawat near Kappok, c. 610 m: *J. & M. Clemens 51609*. Labuan: *Treacher, Barber (Motley) 242*. Sarawak: *Haviland & Hose 3734*. Baram Distr.: *Hose 217*. Miri River: *Hose 531*. Mt Brengoh, near Tegura: *Haviland*. C. Borneo. Lianggagang: *Hallier 2616*. SE. Borneo. W. Kutei, near Mt Kemul, 1200—1500 m: *Endert 3644, 3877*. E. Borneo. P. Tarakan: *Meijer 2484, 2541*.

77a. var. **kingiana** (Prain) Sleum. stat. nov. — *H. kingiana* Prain, Kew Bull. 1912, 342; Gamble, J. As. Soc. Beng. 75, ii, 1914, 343; Ridl., Fl. Mal. Pen. 3, 1924, 142; Burk. & Henders., Gard. Bull. Str. Settl. 3, 1925, 417; Henders., Gard. Bull. Str. Settl. 4, 1927, 102. — *H. obscurinervis* Chatterjee, Kew Bull. 1948, 65.

A typo foliis manifeste in petiolum decurrentibus brevissime petiolatis vel subsessilibus recedit. *Fructus* subgloboso--ellipsoideus, apice quam in typo magis apiculatus, basi distinctius substipitato-contractus.

BURMA. S. Lower Burma. Tavoy, headwaters of Heinize Chaung, 300 m: *Gage 77* (CAL, *typus H. obscurinerv.*; K).

S. SIAM. Puket, Pang-nga, Kao Katalawan, 1700 m: *Kerr 18491* (BM).

MALAY PENINSULA. Perak. Larut, 250—300 m: *Kunstler 3714, 3881, 6217* (K, *lecto-typus H. kingian.*). G. Batu Puteh, 1200 m: *Wray 983, 1160*. Pahang. Rompin, G. Legong, Mengail For. Res.: *For. Dep. F.M.S. 17120*. Renglet, Cameron Highl., c. 1100 m: *Henderson SF 23641*. Fraser Hill, c. 1200 m: *Nur SF 11173*. "Close to the Gap", Pahang side, c. 800 m: *For. Dep. F.M.S. 1072*.

BORNEO. Sarawak: *Beccari P.B. 3609*. SE. Borneo. Banjermasin: *Motley 393*.

78. **H. clivicola** W. W. Smith. Not. Edinb. Bot. Gard. 10, 1918, 179.

Frutex vel arbor parva, 6—10(—12) m alta. *Ramuli* primo molliter rufo-tomentosi, postea glabrescentes corticeque in sicco brunnescenti-nigrescenti obtecti. *Folia* late obovato-oblonga vel obovata, apice breviter obtuse vel subacute acuminata, basi ± late in petiolum cuneata, novella utrinque laxe usque subdense rufo-ferrugineo-pilosa, matura supra costa excepta glabra, denique omnino glabrescentia, in sicco saturate vel atro-viridia, interdum flavescenti-viridia, vix nitidula, subtus pallidiora et ad costam et nervos diutius rufo-ferrugineo-tomentosula demum ± glabrescentia, ± firmule subcoriacea vel fere coriacea, integra vel antice pauciserrata, rarius densius et usque ad laminae basin serrata, (12—)14—20(—22) cm longa, 6—9(—11) cm lata, costa supra parum, subtus bene prominente, nervis lateralibus utroque latere 6—8(—10) curvatis alteque ascendentibus, haud vel obscure anastomosantibus, supra parum, subtus distincte prominentibus, venis venulisque sat dense reticulatis, supra planis vel leviter immersis, subtus parum elevatis; petiolus 1.5—2(—2.5) cm longus, c. 2 mm crassus, initio tomentosus, deinde glabrescens. *Racemi* ex axillis summis orti, suberecti vel patuli, (7—)10—22 cm longi, densiflori. *Rhachis* teretiuscula, pilis subadpressis vel crispulis ferrugineo-tomentosa, ± 2.5 mm crassa. *Bracteae* subovato- usque lineari-lanceolatae, 1—2 mm longae, pilosulae. *Pedicelli* plerumque bini, basi connati, c. 2(—3) mm longi, ± dense rufo-ferrugineo-pilosi. *Perianthium* 13—14(—15) mm longum, glabrum, in vivo viridescenti- vel flavido-aurantiacum, vel luteum, fragrans, tubo 0.5—0.7 mm diam., limbo ellipsoideo 1.5—1.8 mm diam. *Antherae* c. 2.5 mm longae. *Glandulae hypogynae* crassae, late oblongae vel obovatae, truncatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* subglobosus, apice rotundatus, basi breviter substipitato-contractus, 2—2.5 cm diam., pericarpio coriaceo c. 1.5 mm crasso, pedicello 6—7 mm longo, c. 2 mm diam.

CHINA. Yunnan. Hills S of Tengyueh, 25°, 1800—2100 m: *Forrest 8333* (E, *typus*); ibid., Shweli-Salween div., E of Tengyueh, 25° 6′: *Forrest 29802*; ibid., 25° 20′: *Forrest 17493*; ibid., S of Tengyueh, 25°—98° 36′; *Forrest 26237*; ibid., Shweli-Salween div., 25° 40′: *Forrest 18411*.

79. **H. nilagirica** Bedd., Madr. J. Lit. Sci. ser. 23 (III, 1, 1864) 56,

pl. 11 (fl.); Fl. Sylv. 1872, 173; Hook. f. in Hook. f., Fl. Bl. Ind. 5, 1886, 190; Gamble, Fl. Madras 7, 1925, 1243. — *H. cochinchinensis* (non Lour.) Meisn. in DC., Prodr. 14, 1856, 442 quoad pl. assam.; Kurz, For. Fl. Br. Burma 2, 1877, 311. — *H. erratica* Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 189; Lec., Fl. Gén. I. C. 5, 1914. 161; Kanjilal, Kanjilal, De & Das, Fl. Assam, 4, 1940, 106. — *Finschia erratica* Hook. f. ex Boerl., Handl. 3, 1, 1900, 151 (sphalm. pro *Helicia erratica*). — *H. robusta* (non (Roxb.) R. Br. ex Wall.) Hosseus, Beih. Bot. Centralbl. 28, 2. Abt., 1911, 385; Lec., Fl. Gén. I. C. 5, 1914, 161. — *H. hookeriana* Hosseus, Durch König Tschulalongkorns Reich 1913, 165, nom. nud. — *H. stricta* Diels, Fedde Rep. 13, 1915, 527.

Arbor parva vel mediocris, alt. 10 m attingens, cortice pallide brunneo rugosulo. *Ramuli* ad apices tantum ± dense adpresse rufo-pilosi, ceterum citissime glabrati, teretiusculi, in sicco brunneo-nigrescentes. *Folia* elliptica vel oblonga, rarius oblongo-lanceolata, apice breviter acuminata, subacuta vel rarius obtusa, basi cuneata et paullo in petiolum decurrentia, in sicco saepius supra flavido-viridia vel pro parte nigrescentia, haud vel parce nitidula, subtus ± brunnescentia et opaca, chartacea usque subcoriacea, integra vel undulata, interdum imprimis antice pauciserrata, vel praecipue in speciminibus junioribus vel in turionibus densius et ± regulariter subargute serrata (dentibus subincurvatis glandula terminatis obtusiusculis c. 1—1.5 mm altis, 3—10 mm distantibus), initio ad petiolum et utrinque ad basin, imprimis secus costam ± laxe adpresse rufescenti-pilosa, matura omnino glabra, 8—14(—20, in turionibus usque ad 30) cm longa, (2.5—)4—6.5(—9, in turionibus usque ad 12) cm lata, costa supra leviter, subtus distinctius prominente, nervis lateralibus utroque latere c. 6—7, inferioribus 2—3 rectiusculis alteque ascendentibus, superioribus distincte curvatis marginem petentibus et inter sese obscure conjunctis, aliis brevioribus intercalaribus pluribus, omnibus supra minute elevatis, in sicco saepius discoloribus pallidioribus, subtus prominentibus, venis venulisque sat laxe reticulatis utrinque parum elevatis, supra interdum supra impressiusculis; petiolus sat gracilis, (1—)1.5—2(—2.5) cm longus. *Racemi* axillares vel e nodis defoliatis orientes, ± ascendentes, 10—18(—26) cm longi, fere usque ad basin densiflori, solitarii, ad rhachidem et pedicellos laxe usque subdense pilis minutis adpressis rufidulis adspersi. *Rhachis* subangulata, c. 1.5 (raro usque ad 2) mm diam. *Bracteae* anguste ovato-acutae, pedicellis adpressae, rufo-pilosae, vix 1 mm longae. *Pedicelli* crassiusculi, sub anthesi 2—3 mm longi, plerumque bini basique connati. *Perianthium* in vivo albidum vel flavescens, ingrate odoratum. 13—14 mm longum, tubo c. 0.7 mm diam., limbo clavato 1.5—1.8 mm diam. *Antherae* c. 2.5 mm longae. *Glandulae hypogynae* late ovatae vel subrotundatae, liberae, valde approximate. *Ovarium* basi contractum, glabrum, stylo gracili apice manifeste clavato. *Fructus* oblique globosus, apice apiculatus, basi distincte breviter (sub)-stipitato-contractus, (2—)2.5—3.5 cm diam., pericarpio coriaceo 2 mm crasso, pedicello 3—4 mm longo, 2.5—3 (rarius usque ad 4) mm crasso.

INDIA. S. India. W. Ghats, Nilgiri Hills, Walaghat, c. 1000 m: *Beddome* (BM, *typus H. nilagir.*). Sipara Ghat: *Beddome* (BM). SE. Wynaad, Devala, c. 1000 m: *Gamble 15424*. S. Travancore, Mutikaliongat: *Beddome* (BM). Sikkim, reg. trop., 900—1800 m: *J. D. Hooker* (B, BM, E; K, *lecto-tpus H. errat.*; NY, S), *King 2101*, *Kurz*. Gangtok, c. 1500 m: *Lacaita*. Darjeeling Hills, c. 1000 m: *Gamble 745*, *Cowan*

144. Sitong, 1500 m: *Gamble 10265*. Kurseong, c. 1370 m: *Clarke 26612, Sykes & Gamble 2304*. Junction of the Little and Great Rangiet, 550—760 m: *Anderson 1016*. Mungpoo, c. 1370 m: *Cousins 51, Gammie*. Choonbuttee (Chunbati), c. 1000 m: *Clarke 28098*; ibid., c. 760 m: *Gamble 628*. Pankabau, c. 915 m: *Gamble 6971*. Bhutan: *Cooper & Bulley 1122*. Rinkinpung, c. 1200 m: *Gamble 9591*. Kalimpung, c. 1200 m: *Gamble 2305, 10528, Burkill R. E. P. 32281*. E. Bengal: *Griffith 4367 pr. p.*. Leesh valley, 1000 m: *Haines 1010*. Assam: *Griffith 183*. Khasia Hills, 1200—1800 m: *Kurz 197, 331, Burkill & Banerjee 133*. Kullung, Mamloo: *Hooker & Thomson*. Mulkil, c. 1600 m: *Ruse 147*. Surareen, c. 1500 m: *Clarke 14782, 40428, 43685*. Manksandram: *Clarke 14390*. Borpani, c. 1000 m: *Clarke 38164*. Nonglam, c. 1200 m: *Clarke 15423*. Shillong, c. 1060 m: *Collett, Clarke 43924, 44176*; ibid., Bendon Fall, c. 1370 m: *Prain 42, Kanjilal 2382*. Konoma: *Watt R. E. P. 11574*. Nungklao, c. 1000 m: *Clarke 44041*. Mawlengkneng, common between Shillong and Jowai: *Carter E. B. 750*. Nya Bungalow, 1000 m: *Clarke 43317*. Duphla Hills: *Lister*. Outer Arbor Hills, summit of Mt Bapu, c. 1900 m: *Burkill R. E. P. 36926*. Pynursla: *Biswas 4012*. Naga Hills, 1200—1500 m: *Meebold 9261, Bor 4497*. Jainthia Hills, c. 1400 m: *Burkill & Banerjee 293*. Chennap valley: *Gallatly 313*. Manipur. Laimatak, 1200—1500 m: *Meebold 5884*. Myangkhong, 1000—1200 m: *Watt 7160*.

Burma. Upper Burma. Nam Tamai valley, 27° 45′—97° 45′, c. 2100 m: *K. Ward 13517*. Ruby Mines: *Abdul Huk 104, 203*. Mogok, 1200—1500 m: *Rodger 163, 333*. Upper Chindwin, c. 1830 m: *Mackenzie 9*. Maymyo, 600—1100 m: *Meebold 8033, Haines, Rodger 104, Badal Khan 14, 63, 261, Lace 3150, 5800, Parkinson 252, 662, 2076, Buchanan 34*. Phyet, c. 1900 m: *Toppin 6226*. Katha, 1500—1800 m: *Rodger 166*. Bhamo, Cachin Hills: *Cubbitt 460, Shaik Mokim*. Pegu, Karen Hills: *Kurz 987*. S. Shan States, c. 1200 m: *K. Ward 8820, Rock 2196, 2200, Collett 726*; ibid., Laikha border, c. 1900 m: *Robertson 360*; ibid., Kuy Tung, c. 1680 m: *McGregor 722 bis*. Lower Burma. Tenasserim, Moulmein, 1800—2100 m: *Parish 1023*. Mooleyit, c. 1900 m: *Parkinson 7, Gallatly 452*.

China. Yunnan. Mekong-Salween div., 26° 40′: *Forrest 18204*. Szemao, 1370—1525 m: *Henry 11935* (B, *typus H. strict.*), *11935 A, 12858*. Ship-ping Hsien, 200 m: *Tsai 53359*. Mengtze: *Henry 11383*. Tengyueh, c. 1800 m: *Forrest 26668*. Shunning, 1720 m: *Yü 16089*. Mong-ka, 1750 m: *Tsai 56374, 56915*. Mong-Hai, 1200—1500 m: *K. Ward 12752*.

Indochina. Tonkin. Cha-pa, c. 1000 m: *Poilane 12895, Pételot 1626*. Annam. Tourane, 600—1500 m: *Poilane 7116*. Massif du Langbian, 900—1200 m: *Chevalier 40566, 40575*; ibid., Dran, 1000 m: *B. Kloss, Poilane 3926*. Haut Donai, Djirinh, 1000—1900 m: *Poilane 22562*. Dalat: *Hayata 186, Evrard 285, 1083*. Cambodge. Thong, Knang Prépeu: *Pierre 692 pr. p.* Laos. Plateau d'Attopeu: *Harmand 1150*.

Siam. Payap, Chiengmai, Doi Angka (Doi Intanon), 1650—2570 m: *Hosseus 357, Kerr 5304, Put 3782, 3786, Garrett 532*; Chiengdao, c. 1450 m: *Garrett 1179*; Pang Tawn: *Put 3911*; Doi Sutep, 800—1500 m: *Kerr 622, R. For. Dep. Thailand 2843, 3838, 4539*; Doi bakom Pok, Muang Fang, 2000 m: *Kerr 5195*. Udawn, Phu Krading, Loie, 1040 m: *R. For. Dep. Thailand 5635*; Kao Krading, Loi, 1200 m: *Kerr 20058*.

80. H. paucinervia Merr., Philip. J. Sc. 17, 1921, 247; En. Philip. 2, 1923, 100.

Frutex vel arbor parva, usque ad 5 m alta. *Ramuli* teretes, laeves, in sicco saturate rubro-brunnei, novelli laxe minutissime adpresse pilosuli. *Folia* oblongo-elliptica vel subovato-oblonga, apice late acuminata, obtusa, interdum subrotundata, basi in petiolum cuneata paulloque decurrentia, firmule subcoriacea, in sicco supra olivaceo-brunnescentia et nitida, subtus aequaliter brunnea et opaca, interdum utrinque saturate brunnea, integra vel superne leviter et distanter grosse serrata, margine parum revoluta, 10—15 cm longa, 4—6(—8) cm lata, costa utrinque prominente, nervis lateralibus utroque latere 4—5 curvato-ascendentibus, inter sese sat manifeste conjunctis utrinque prominentibus, venis venulisque sat dense reticulatis utrinque bene prominulis; petiolus 1(—1.5) cm longus. *Racemi* axillares vel ex axillis defoliatis orti, erecti, sat densiflori, 14—20 cm longi. *Rhachis* teretiuscula, sicut pedicelli laxissime pilis minutis adpresss rufescentibus

pilosula, c. 1.5 mm diam. *Bracteae* subdeltoideae, acutiusculae, vix 0.5 mm longae. *Pedicelli* plerumque bini, liberi vel ima basi connati, 2—3 mm longi. *Perianthium* in vivo albidum vel flavescens, glabrum, (16—)17—19 mm longum, tubo gracili 0.4—0.5 mm diam., limbo ellipsoideo 1—1.2 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* late ovatae, obtusae, superne liberae, inferne in cupulam connatae. *Ovarium* glabrum. *Fructus* subglobosus, laevis, apice brevissime apiculatus, paullo contractus, ± 3.5 cm diam., pericarpio coriaceo 2—3 mm crasso, pedicello 4 mm longo, c. 3 mm crasso.

PHILIPPINES. Mindanao. Surigao, on river banks at the iron deposit on the NE. coast, 300 m: *B. S. 34610 Ramos & Pascasio* (PNH †, *typus*, haud vidi), *34621*. Dinagat Isl., iron deposit: *B. S. 83867, 84098 Ramos & Convocar.*

81. **H. pallescens** Diels, Bot. Jahrb. 54, 1916, 200.

Arbuscula divaricato-ramosa, trunco cinereo-corticato. *Ramuli* novelli subangulati, glabri. *Folia* oblongo-lanceolata vel oblonga, rarius anguste elliptica, apice sensim acuminata, subfalcata, subacuta, basi sensim in petiolum angustata, haud decurrentia, coriacea vel subcoriacea, glaberrima, in vivo saturate viridia et opaca, subtus glaucescentia, in sicco pallide olivaceo-viridescentia, subopaca, integra, 15—20 cm longa, 3.5—7 cm lata, costa supra in sicco bene visibiliter immersa, subtus crasse prominente, nervis lateralibus utroque latere 7—8 longe curvato-ascendentibus et praeter marginem excurrentibus, supra parum, subtus distinctius prominentibus, obsolete inter sese curvato-conjunctis, venis venulisque dense reticulatis utrinque bene visibiliter prominulis; petiolus crassiusculis, ± 1 cm longus. *Racemi* ex axillis ramulorum defoliatorum orti, gracillimi, pedunculo c. 1.5 cm longo incluso 6—8 cm longi. *Rhachis* glabra vel pilis solitariis minutis adspersa, 1.5 mm diam. *Bracteae* haud visae, probabiliter citissime caducae. *Pedicelli* saepius bini, liberi vel usque ad medium connati, 3—4 mm longi. *Perianthium* in vivo albidum, sparse pilis ferrugneis gracillimis adpressis obsitum, fere glabrum, 18—20 mm longum, tubo 0.6 mm diam., limbo elongato-ellipsoideo fere 2 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* crassiusculae, late obovatae, truncatae vel leviter emarginatae, liberae, approximatae. *Ovarium* glabrum. *Fructus* ignotus.

NEW GUINEA. NE. New Guinea. Sepik Distr., "Lordberg", 1000 m: *Ledermann 10184* (B, *typus*), *10056* (B †).

82. **H. graciliflora** Merr., Philip. J. Sc. 3, 1908, 132; En. Philip. 2, 1923, 99.

Arbor parva c. 6 m alta, ramulis gracilibus, in partibus novellis dense subadpresse rufo-ferrugineo-tomentosis, ceterum cito glabratis, brunneis vel cinerascentibus. *Folia* elliptico-lanceolata, apice sat breviter (1—2 cm longe) subacute acuminata, saepius paullo curvata, basi in petiolum manifestum attenuata, parum decurrentia, subinaequilateralia, chartacea usque subcoriacea, sat tenuia, in sicco supra brunnescenti-olivacea, subnitida, subtus brunnescentia et opaca, integra vel antice distanter paucidentata (dentibus prorsus versis acutiusculis vix 1 mm altis), rariter grosse paucilobata, recentissima utrinque sat dense longeque adpresse rufo-pilosa, maturitate glabrescentia, adulta subtus ad costam diutius laxe rufo-pilosa, denique glaberrima, (8—)10—14(—20) cm longa, 2.5—4.5(—6) cm lata, costa supra fere plana, subtus prominente, nervis lateralibus utroque latere 7—8 inferne manifeste rectiusculis, superne curvatis, praeter marginem inter sese conjunctis supra parum, subtus distinctius elevatis, venis venulisque utrinque sat dense laeteque prominulo-reticulatis; petiolus gracilis glabrescens, 1—1.5(—2) cm longus. *Racemi* axillares solitarii, ascendentes, gracillimi, laxiflori, 12—20 cm longi, ubique subdense pilis longis rufis pro parte deciduis subadpressis induti. *Rhachis* 0.5—0.7 mm diam. *Bracteae* ovato-lanceolatae, tenues, $^1/_2$—$^2/_3$ pedicellorum longit. aequantes. *Pedicelli* plerumque bini, 0.5—1 cm distantes, graciles, c. 3 mm longi, basi infima tantum connati. *Perianthium* tenuissimum, 14—16 mm longum, sub anthesi basi tantum pilosum, ceterum glabrescens, tubo 0.4 mm diam., limbo ellipsoideo 1.2 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* subquadratae, apice retusae, liberae, valde approximatae itaque cupulam aemulantes. *Ovarium* glabrum. *Fructus* ignotus.

PHILIPPINES. Mindanao. Lanao, Lake Lanao, Camp Keithley, 700 m: *Clemens* (B, BO, NY; PNH †, *typus*), Sept. 1907.

83. **H. biformis** Sleum., Bot. Jahrb. 70, 1939, 140.

Arbuscula 4—6 m alta. *Ramuli* subteretes, glabri, cito cortice cinereo obtecti. *Folia* elliptico-oblonga vel elliptica, late apice acuminata, obtusa, rarius breviter emarginata, basi late in petiolum attenuata, interdum subrotundata, parum decurrentia, coriacea, rigidiuscula, in sicco supra flavescentia usque saturate olivacea, subtus castanea et opaca, novella utrinque imprimis subtus dense pilis substrigosis pallidis obtecta, epidermide pro parte squamuloso-secernente, matura glabra vel subtus brevissime laxissime adpresse rufescenti-pilosula, integra, (4.5—)5.5—8(—9) cm longa, (2.5—)3—4.5 cm lata, costa supra parum elevata vel (in sicco!) impressa, nervis lateralibus utroque latere 6—8 inferne rectiusculis, marginem versus curvatis et manifeste inter sese conjunctis, supra leviter immersis, subtus manifeste prominentibus, venis venulisque supra subinconspicuis, subtus parum prominulo-reticulatis; petiolus crassus, saepe brevissime adpresse rufo-pilosus, 0.5—1 cm longus. *Racemi* ex axillis foliorum delapsorum orti, densiflori, subascendentes vel horizontaliter patentes, ubique sat dense pilis rufidulis adpressis obsiti, 5—9 cm longi. *Rhachis* rigidiuscula, 2—2.5 mm diam. *Bracteae* ovato-lanceolatae, acutae, 1.5—2 mm longae, plerumque cito caducae. *Pedicelli* fere semper bini, liberi vel basi connati, crassiusculi, 3—4 mm longi. *Perianthium* in vivo laete rubrum, 20—23 mm longum, initio subdense, serius laxius rufo-pilosum, ab apice glabrescens, tubo 1 mm diam., limbo elongato-ellipsoideo 2—2.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* in cupulam crenulatam connatae. *Ovarium* glabrum, stylo crassiusculo. *Fructus* globosus, 1.5 cm diam., pedicello 5 mm longo et 2 mm crasso.

NEW GUINEA. Papua. Centr. Distr., Murray Pass, Wharton Range, 2840 m: *Brass 4717* (A, BO; NY, *typus*), *4535*.

84. **H. cauliflora** Merr., J. Arn. Arb. 19, 1938, 24.

Arbor 5—6 m alta. *Ramuli* novelli in sicco brunnescentes, omnino glabri, subteres, vetustiores griseo-corticati. *Folia* lanceolata vel oblongo-lanceolata, apice sensim acuminata, apice ipso subobtusa, basi in petiolum cuneata parum decurrentia, subcoriacea, in sicco supra viridi-olivacea, nitida, subtus brunnescentia minus nitentia, integra, glabra, (8—)10—17 cm longa, 2—3 cm lata, costa supra inferne leviter elevata, superne paullo impressa, subtus prominente, nervis lateralibus utroque latere 7—8 inferne bene rectiusculis, ante marginem curvatis et anastomosantibus, supra subobscuris, subtus prominulis, venis venulisque supra laxe, subtus dense reticulatis et manifestius prominulis; petiolus c. 1 cm longus, basi incrassatus et rugosulus. *Racemi* solitarii vel depauperato-fasciculati, in ramulis crassioribus vel in trunco e tuberculis lignosis usque ad 2.5 cm diam. orti, satis laxiflori, 12—15 cm longi. *Rhachis* rigida, subangulata, 2—2.5 mm diam., sicut pedicelli sat dense pilis adpressis brevibus rufidulis obtecta. *Bracteae* subulatae c. 1 mm longae, pilosulae. *Pedicelli* crassiusculi, plerumque bini et ima basi connati, sub anthesi 4—5 mm longi, denique usque ad 7 mm accrescentes. *Perianthium* sat gracile, 30—35 mm longum, inferne glabrum, superne ad limbum laxe adpresse rufescenti-pilosulum, tubo c. 1 mm diam., limbo clavato 2 mm diam. *Antherae* 2.5 mm longae. *Glandula hypogynae* late ovatae, truncatae, liberae, approximatae, cupulam aemulantes. *Ovarium* glabrum, stylo gracillimo sat abrupte distincte clavato ibique c. 1 mm diam. *Fructus* ignotus.

INDOCHINA. Tonkin. Route from Vinh Yen to Tam Dao: *Pételot 5684* (A, *typus*; NY, P).

85. H. longipetiolata Merr. & Chun, Sunyatsenia 2, 1935, 217, t. 41; Tanaka & Odash., J. Soc. Trop. Agr. 10, 1938, 364; Masam., Fl. Kainant. 1943, 63.

Arbor 5—12 m alta, trunco c. 25 m diam., cortice griseo vel castaneo. *Ramuli* apicibus decidue rufo-pilosi ceterum glabri, subteretes, vetustiores in sicco brunnei demum griseo-corticati. *Folia* oblongo-lanceolata, rarius oblonga, apicem versus gradatim attenuata, apice ipso subacuta rarius obtusiuscula, glandula terminali distincta instructa, basi in petiolum cuneata, in superiore petioli parte ± longe anguste decurrentia, subcoriacea usque coriacea, firma, glabra, in vivo saturate viridia, subtus pallidiora, glaucescentia, in sicco supra olivaceo-viridia, subnitida, subtus cinerascenti-brunnescentia et opaca, integra, (9—)10—16(—18) cm longa, 2.5—4(—6) cm lata, costa utrinque bene prominente, nervis lateralibus infimis utroque latere singulis e basi orientibus, superioribus 7—8(—9) a costa abeuntibus inferne bene rectiusculis demum bifidis et curvato-anastomosantibus, intercalaribus paucis, omnibus utrinque aequaliter prominulis, venis venulisque subdense reticulatis utrinque leviter sed visibiliter prominulis; petiolus 2—3(—5) cm longus, basi ipsa valde manifeste incrassatus et rugosus. *Racemi* plerumque ex axillis defoliatis orti, solitarii, fere ad basin subdense floriferi, 12—20 cm longi. *Rhachis* subteres, laxissime adpresse rufo-pilosa vel glabrescens, c. 1.5 mm diam. *Bracteae* subulatae, 0.5 mm longae. *Pedicelli* crassiusculi laxe adpresse rufo-pilosi, plerumque bini et basi tantum connati, ± 3 mm longi. *Perianthium* in vivo albidum, viridescens vel purpurascenti-suffusum, glabrum vel laxissime adpresse pilosulum, 15—16 mm longum, tubo 0.6—0.8 mm diam., limbo elongato-ellipsoideo 1.8—2 mm diam. *Antherae* c. 2.5 mm longae. *Glandulae hypogynae* late ovatae, liberae, valde approximatae vel ima basi connatae. *Ovarium* glabrum. *Fructus* ovoideus, apiculatus, basi breviter contractus, maturus purpureo-nigrescens, c. 2.5 cm diam., pedicello 5 mm longo, 1.5 mm crasso.

CHINA. Hainan. Tung Gap and Tung Gap to Munfa Shi: *Chun & Tso 43706*

(A, B; NY *typus*), *43741, 43903.* Mocheung Ling, 500—900 m: *Chun & Tso 44294.* Loco haud indicato: *Wang 35905, 36056, How 73216.*

86. H. stenophylla Merr., J. Arn. Arb. 19, 1938, 25.

Arbor parva, ramulis etiam recentissimis glabris gracilibus, teretibus, brunnescentibus demum cinerascentibus, subnitidis. *Folia* (anguste) lanceolata, apicem versus sensim acuminata, subacuta, basi in petiolum cuneata, subcoriacea, in sicco supra saepius olivaceo-viridia, interdum saturate castanea, subtus plerumque brunnea, supra nitida, subtus subnitida, glabra, in superiore dimidio vel tertio remote serrata (dentibus prorsus versis obtusiusculis c. 1 mm altis et 4—6(—10) mm distantibus), basin versus plerumque integra, rarissime denticulis utroque latere 2 exceptis integra, 9—13 cm longa, (1—)1.5—2.5(—3) cm lata, costa utrinque parum vel subtus magis prominente, nervis lateralibus utroque latere 8—10 inferne rectiusculis, superne arcte curvatis et ascendentibus, prope marginem manifeste inter sese conjunctis, utrinque leviter prominentibus, venis venulisque utrinque dense prominulo-reticulatis; petiolus gracilis, glaber, 8—10 mm longus. *Racemi* axillares, solitarii, elongati, graciles, penduli, pedunculo 4—6 cm incluso 25—30 cm longi, ante plenam anthesin ubique subdense, sub anthesi laxe pilis elongatis adpressis rufis induti. *Rhachis* 1 mm diam. *Bracteae* ovato-lanceolatae, acutae, ± persistentes, 1.5—2 mm longae. *Pedicelli* graciles, plerumque bini et in inferiore tertio connati, sub anthesi 6—7 mm longi, postea usque ad 9 mm accrescentes. *Perianthium* in vivo probabiliter albidum, gracile, 20—23 mm longum, tubo 0.4 mm diam., limbo subgloboso-ellipsoideo c. 1 mm diam. *Antherae* 1.5 mm longae. *Glandulae hypogynae* in annulum crenatum connatae. *Ovarium* glabrum, stylo filiformi. *Fructus* ignotus.

INDOCHINA. Annam. Tourane: *J. & M. Clemens 3487* (A, *typus*; B, K, NY, P).

87. H. cochinchinensis Lour., Fl. Cochinch. 1790, 83; ed. Willd. 1793, 105; R. & S., Syst. 3, 1818, 306; Mant. 3, 1827, 234; Bl., Ann. Sc. Nat. II, 1, 1834, 214; Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 82; Meisn. in DC., Prodr. 14, 1856, 442 quoad pl. Loureir.; Benth., Fl. Hongk. 1861, 295; Forbes & Hemsl., J. Linn. Soc. Bot. 26, 1891, 394; Matsum. & Hayata, En. Pl. Formos. 1906, 354; Ind. Pl. Jap. II, 2, 1912, 48; Dunn & Tutch., Fl. Kwangt. & Hongk. 1912, 226; Lec., Fl. Gén. I. C. 5, 1914, 161; Crevost & Lemarie, Cat. Prod. Indoch. 1917, 261; Groff, Ding & Groff, Lingn. Agr. Rev. 1 (1923), 1924, 75; Chun, Cat. Trees & Shr. Chin. 1924, 38; Merr., Lingn. Sc. J. 5, 1927, 68; Yanagita, Ill. Seedl. For. Trees 1, 1927, fig. 191; l. c. 3. 1927, fig. 349 veg. & var.; Masam., Prel. Rep. Veg. Yak. 1929, 69; Hand.-Mazz., Symb. Sin. 7, 1929, 157; Sasaki, Cat. Gov. Herb. Formosa 1930, 185; Mak. & Nem., Fl. Jap. ed. 2, 1931, 238; Honda & Sakisaka, Syst. Pl. Jap. 1931, 159; Ito, Fl. of Mieken, Jap. 1932, fig. 281; Masam., Mem. Fac. Sci. Agr. Univ. Taihoku 11, 1934, 163; Merr., Comm. Loureiro Fl. Cochinch., Trans. Am. Phil. Soc. N. S. 24, 1935, 140; Tanaka & Odash., J. Soc. Trop. Agr. 10, 1938, 364; Masam., Fl. Kainant. 1943, 63. — *Roupala cohinchinensis* (Lour.) R. Br., Trans. Linn. Soc. 10, 1810, 192 (*Rhopala*); R. & S., Syst. Veg. 3, 1818, 429. — *R. robusta* (non Roxb.) Spreng., Syst. Veg. 1, 1825, 482 pr. p. (*Rhopala*). — *H. lancifolia* S. & Z., Fl. Jap. Fam. Nat. 2, Abh. Akad. Münch. 4, 3, 1846, 198; Walp., Ann. 1, 1848/49, 592; Meisn. in DC., Prodr. 14, 1856, 439; Miq., Ann. Mus. Bot. Lugd. Bat. 3, 1867, 137; Franch. & Sav., Enum. Pl. Jap. 1, 1875, 403; Engl. in E. & P., Nat. Pfl. Fam. 3, 1, 1893, 146. — *H. tonkinensis* Lec., Not. Syst. 1, 1910, 190; Fl. Gén. I. C. 5, 1914, 162. — *H. annularis* W. W. Smith, Not. Bot. Gard. Edinb. 10, 1918, 178; Merr., J. Arn. Arb. 19, 1938, 23.

Frutex 1—5 m vel arbuscula 3—10 m alta, rarius arbor 20 m. alt. attingens, trunco cortice intense cinerascente verrucoso. *Ramuli* glabri, novelli subangulati, in sicco olivacei, vetustiores teretes nigrescentes. *Folia* lanceolata usque lanceolato-oblonga vel oblanceolata, rarius subobovato-oblonga, apice subabrupte acuminata, apice ipso subacuta vel obtusa, basi in petiolum cuneata, in superiore petioli parte ± decurrentia, firmule chartacea usque subcoriacea, rarius fere coriacea, in sicco supra flavido-viridia vel brunnea, interdum nigrescentia, subtus brunnea, supra subnitida, subtus opaca, glabra, integra vel plerumque antice pauciserrata (dentibus glandula terminatis obtusiusculis 1—2 mm altis et 3—6 mm distantibus), in speciminibus junioribus vel in turionibus omnino argute serrata, (5—)6—13 (raro usque ad 14) cm longa, 2—3(4, rarius usque ad 5) cm lata, costa supra subtusque prominente, nervis lateralibus utroque latere c. 6—7, omnibus vel certe superioribus inferne distincte rectiusculis, interque sese subparallelis, marginem versus curvatis et anastomosantibus, intercalaribus additis plerumque brevioribus pluribus, omnibus utrinque leviter sed bene visibiliter elevatis, venis venulisque sat dense reticulatis utrinque minute prominulis, interdum subobscuris; petiolus sat gracilis, 0.7—1.2(—1.5) cm longus. *Racemi* solitarii, axillares vel e nodis defoliatis orti, interdum subterminales, sat graciles, stricti, subascendentes, 4—17 cm longi, fere usque ad basin subdense florigeri, plerumque omnino glabri, rarius ad rhachidem et pedicellos laxe pilis subadpressis rufescentibus adspersi. *Rhachis* angulata, c. 1 mm diam. *Bracteae* subovato-lanceolatae, subpersistentes, acutae, 1—1.5 mm longae. *Pedicelli* sub anthesi 3—4 mm longi, plerumque bini, basi vel usque ad medium connati, subgraciles. *Perianthium* in vivo albidum vel flavescens, odoratum, 10—12 (—14, rarius usque ad 15) mm longum, tubo c. 0.5 mm diam., limbo clavato c. 1.2—1.5 mm diam. *Antherae* 2 mm longae. *Glandulae hypogynae* late ovatae vel ellipticae, interdum subrotundae, obtusae vel truncatae, interdum leviter retusae, liberae vel sat approximatae et inferne cohaerentes. *Ovarium* glabrum, stylo gracili. *Fructus* subgloboso-ovoideus, breviter apiculatus, basi 1—2 mm contractus, sulco longitudinali manifesto, maturus azureo-nigrescens, c. 1.5 cm longus, 1.2 cm crassus.

INDOCHINA. Cochinchina. *Loureiro* (BM, *typus H. cochinch.*) Bien Hou: *d'Alleizette.* Cambodge. Km 175 route de Frimbell: *Poilane 449.* Annam. Vinh. entre Phu-qui et Cau-Giat: *Fleury* (Herb. *Chevalier 32618*). Thua-thien, Binh dien: *Poilane 1428.* Haut Donai, 900 m: *Pételot 8923.* Blao, 800 m: *Poilane 21891, 21915, 21975, 22204.* Quang-tri, Dong Tam Pe: *Poilane 30050.* Tourane: *J. & M. Clemens 4136, Poilane 7526.* Col des Nuages près Tourane, 400—500 m: *Poilane 7903.* Massif du Langbian, 1000—1100 m: *Chevalier 31267.* Tonkin. Khang-thuong: *Bon 1613.* Thien-thou: *Balansa 5417, Bon 5417.* Thoi-Nguyen: *Pételot 5839.* Ninh Binh, Cho Ganh: *Pételot 950.* Sontay, Mt Bavi: *d'Alleizette.* Phu Tho, Phu Ho: *Pételot 1061, 6184.* Bat-bac: *Balansa 3802* (B, L, K; P, *typus H. tonkin.*).

CHINA. Yunnan. Szemao, c. 1400 m: *Henry 12315* (E, *typus H. annular.*; K, NY), *12315A, 12315B.* Mengtze, c. 1200 m: *Henry 10756.* Hills NW of Tengyueh, 25° 25′—98° 15′: *Forrest 27167.* Tchen-fong-shan, 650 m: *Maire.* Ping-pien Hsien, 1400 m: *Tsai 55124, 60275, 62777.* Szechuan. Kiang-Yu-Hsien: *Cheng 2673.* Mt Omei, 500 m: *Liu 1292.* Kwangsi. Shap Man Taai Shan, Kwangtung border: *Tsang 22236, 22624, 23977, 24030, 14355, 24569.* S. Nanning, 760—1000 m: *Ching 8044, 8054, 8318.*

Tou Ngok Shan: *Tsang 23257*. Tian-chen: *Ching 7823*. Se Tze Shan: *Tsang 23336*. Hainan, 250—1000 m: *Tsang 409, 439, Lei 254, 713, Lau 1453, 1640, Wang 35344, How 73005, Chun 7018, 7074, Ford, Chun & Tso 43937*. Hunan. Sintien Hsien, 600 m: *Fan & Li 378*. Tschangtscha: *Handel-Mazz. 11909*. Tsingtsehou: *Handel-Mazz. 11045*. Kwangtung: Canton vicinity: *Henry, Canton Chr. Coll. 433, 1917, 1540bis, 3050*. Lung T'au Shan: *Canton Chr. Coll. 12690, McClure 13759*. Lin distr.: *Canton Chr. Coll. 3433, 3463*. Lo Fou Shan: *Tsiang 1614, Merrill 11001*. Kau Fung: *Tsang 20999*. H. Heung Shan: *Canton Chr. Coll. 6290*. Sunwie: *Tsiang 2932*. Pon-tan, Luichow: *Tsiang 2548*. Siudsao: *Handel-Mazz. 307*. Fan Shiu Shan: *Lau 2558*. Tsing Wan Shan: *Lau 2264*. Chang-kiang: *Chun 5830*. Hongkong: *Ford, Wright 459, Tsiang 2948*. Kiangsi. Sai Hang Cheung: *Lau 3995*. Oo Chi Shan: *Lau 4436*. Wuchiao, near Hualing Shan, 200 m: *Tsiang 10485*. Lipeichiao, Tsoongjen, 300 m: *Tsiang 10181*. Ningdu-Tjingan, 500 m: *Handel-Mazz. 501*. Fukien. Futchau: *Warburg 5801*. N. Fukien, near Chekiang border, 600—1200 m: *Ching 2248*. Kuliang: *Chung 6461*. Diongloh: *Fukien Chr. Univ. 2579*. Yenping, 650 m: *Chung 2854*. Minhow Hsien: *Chung 2240*. Kushan: *Chung 6673, Fukien Chr. Univ. 5761*. Amoy: *Chung 4685*. Central Fukien: *Dunn 234*. Chekiang. Lung Chiung Hsien: *Hu 460*. Hupeh. Enshih Hsien: *Chow 1838*.

FORMOSA. Shinchiku, Hoppo: *Wilson 10318, Kanehira 262*. Koasong: *Price 536*. Bankinseng Mts: *Henry 819*. Taihoku: *Wilson 11233*. For other localities cf. Sasaki, 1930, 185.

JAPAN. Riu Kiu Isl. & Okinawa, Amami-Osima, Tanegasima, cf. Masamune 1934, 163. Yakushima: *Masamune, Faurie 3807*. Kyusyu. Nagasaki: *Pierot 601* (L, *holo-typus H. lancifol.*; A, M), *Maximovicz, Oldham*. Mt Kuishima: *Tachiro*. Kagoshima, Mt Kaimon: *Sakurai*. Sikoku cf. Masamune 1934, 163. Honsyu. Shingu Wakayamaken (c. 33° 40′): *Uno*, apparently the most northern locality of *H. cochinchinensis*. — "Japan", loco haud indicato: *Bürger, Zollinger 502*.

87a. var. **pseuderratica** Sleum. var. nov.

Foliis late oblongis vel late obovato-ellipticis 8—18(—22) cm longis, 3.5—6.5(—10) cm latis, in sicco semper viridi-flavescentibus, reticulatione venarum venularumque utrinque magis prominente, interdum supra leviter immersa, perianthio 14—17(—18) mm longo a typo recedit. *Fructus* (*Tsang 23336*) obovoideo- vel ellipsoideo-globosus, 2—2.3 cm longus, 1.6—1.9 cm diam., levissime 6-costatus, pericarpio 1 mm crasso, nigrescente. — An species propria?

CHINA. Kweichow. Tuhshan, 500—550 m: *Tsiang 6630, 7041*. Sanhoa, 700 m: *Tsiang 6264*. Kwangsi. San Ching Hsien, 300 m: *Steward & Cheo 1002*. Ling Yün Hsien, 1360 m: *Steward & Cheo 680*. Tung Hoo, N of Luchen: *Ching 5628*. Miu Shan, N of Luchen, 1060 m: *Ching 6001*. Yeo Mar Shan, N of Hin Yen, 1430 m: *Ching 7196*. Dar Shan, S. Nanning, 915 m: *Ching 8014*. Shap Man Taai Shan: *Tsang 24254*. Kwangtung. Lok Chong: *Tso 20285, 20985, 21051* (K; NY, *typus*; P). Ying Tak: *Wang 509, Chun 30425*. Teng Wu Shan: *Lau 20279, Canton Chr. Coll. 3069 Levine, Ho 60062*. Lo Fau Shan: *Ford 21, Canton Chr. Coll. 1556 Levine, Merrill 10358*. Ching Yuen distr.: *Canton Chr. Coll. 2093 Levine*. Fan Shiu Shan: *Lau 2600*. Hongkong: *Ford 329*.

87b. var. **lungtauensis** Sleum. var. nov.

Foliis latioribus 13—22 cm longis, (6—)7—12 cm latis, in sicco plerumque saturate castaneis a typo diversa.

CHINA. Kwangtung. Ye Wong Fa, Yang Shan, S of Linchow: *Tsui 747* (K, *typus*, "*H. erratica* Hook. f. var. *lungtauensis*" F. P. Metcalf msc.; NY). Lung T'au Shan: *Mell 746, 949, Canton Chr. Coll. 12456, 12612, Lingnan Univ. Herb. 12690*. Yam Na Shan: *Tsang 21378*. Thai-young: *Dalziel*. Yung yun city: *Lau 913* (→ var. *pseuderratica*). Wah Shui Shan: *Lau 948* (→ var. *pseuderratica*). Kiangsi. Sai Hang Cheung: *Lau 4112* (→ var. *pseuderratica*).

Species obscurae

H. ovata (Jack) Benn. in Benn. & Br., Pl. Jav. Rar. 1838, 84; Meisn. in DC., Prodr. 14, 1856, 439; Miq., Fl. Ind. Bat. I, 1, 1858, 984. —

Roupala ovata Jack, Mal. Misc. 2, 1822, 95 (*Rhopala*), reimpr. Hook. Comp. Bot. Mag. 1, 1836, 259; Merr., J. Arn. Arb. 33, 1952, 243.

"Folia subsessilia ovata utrinque glaberrima integerrima, alterna et opposita, c. 25 cm longa, c. 15 cm lata, marginibus revolutis, venis conspicuis. Racemi axillares, pedicellis brevissimis cum perianthiis ovariisque levissime tomentosis."

SUMATRA. Tapanuli, *Jack.*

No type-specimen is available. I have seen no material from Sumatra which would coincide with the original description. Possibly the simple-leaved form of a species of *Heliciopsis.*

H. serrata R. Br. in F.-Vill., Nov. App. 1880, 182.

"Ex silvis S. Mateo, Luzon."

No material seen. Certainly not the true *H. serrata* (R. Br.) Bl., which does not occur in Luzon.

Roupala serrata Roxb., Hort. Beng. 1814, 83 (*Rhopala*), nom. nud.

"Malay Arch." An *Helicia serrata* (R. Br.) Bl. (*Roupala serrata* R. Br.)?

Species e genere excludendae

H. artocarpoides Elm., Leafl. Philip. Bot. 5, 1913, 1826 = *Heliciopsis.*

H. balansae Lec., Not. Syst. 1, 1910, 189 = *Heliciopsis.*

H. darlingiana F. v. M., Fragm. 5, 1865, 24 = *Darlingia spectatissima* F. v. M.

H. diversifolia White, Queensl. Dep. Agr. Bot. Bull. 20, 1918, 18, f. = *Hicksbeachia.*

H. henryi Diels in Fedde Rep. 13, 1915, 528 = *Heliciopsis.*

H. heyana Bail., Queensl. Fl. 4, 1901, 1329 = *Macadamia.*

H. incisa K. & V., Bull. Inst. Bot. Btzg 2, 1899, 10 = *Heliciopsis.*

H. lanceolata K. & V., Bull. Inst. Bot. Btzg 2, 1899, 10 = *Heliciopsis.*

H. lobata Merr., Lingn. Sci. J. 6, 1930, 276 = *Heliciopsis.*

H. micronesica Kaneh., Fl. Micron. 1933, 95, japon.; Bot. Mag. Tokyo 47, 1933, 669 = *Finschia chloroxantha* Diels.

H. pallidiflora W. W. Smith, Not. Bot. Gard. Edinb. 10, 1918, 179 = *Heliciopsis.*

H. parasitica Pers., Syn. 1, 1805, 214, based on *Helixanthera parasitica* Lour. = *Loranthus pentapetalus* Roxb.

H. praealta F. v. M., Fragm. 3, 1862, 37 = *Macadamia praealta* (F. v. M.) Bail.

H. sayeriana F. v. M., Vict. Nat. 3, 1886, 93 = *Hollandaea sayeri* F. v. M.

H. scottiana F. v. M., Fragm. 4, 1864, 107 = *Xylomelum salicinum* A. Cunn.

H. terminalis Kurz, For. Fl. Br. Br. Burma 2, 1877, 312 = *Heliciopsis.*

H. ternifolia (F. v. M.) F. v. M., Fragm. 2, 1860, 91 = *Macadamia ternifolia* F. v. M.

H. velutina Prain, Kew Bull. 1912, 343 = *Heliciopsis.*

H. verticillata F. v. M., Fragm. 6, 1868 = cf. *Brabeium stellatifolium* L.

H. whelani Bail., Rep. Exp. Bellend.-Ker 1889, 55 = *Macadamia whelani* (Bail.) Bail.

VI. HELICIOPSIS SLEUM., A NEW GENUS OF THE PROTEACEAE-GREVILLEEAE.

Heliciopsis Sleum. gen. nov. — Arbores dioicae. *Folia* spiralia, simplicia vel plurilobata usque pinnatisecta, integra, sessilia vel petiolata. *Racemi* simplices spiciformes, multiflori, axillares vel e ligno vetere orti. *Bracteae* subulatae, parvae vel elongato-lineares, ± persistentes; bracteolae minutae ± caducae. *Pedicelli* plerumque gemini, liberi vel usque ad $^{4}/_{5}$ long. connati. *Perianthium* rectum, tubo sat gracili, limbo clavato vel ellipsoideo, in floribus ♂ basin versus sensim attenuatum, in floribus ♀ ovario bene evoluto basi dilatatum, in plena anthesi in segmenta 4 usque ad basin fissum, segmentis revolutis. *Stamina* 4, fere sessilia; antherae oblongae, in floribus ♂ pollen reticulatum praebentes, in floribus ♀ polline carentes; connectivum in apiculum productum. *Glandulae hypogynae* 4 liberae, plerumque approximatae itaque cupulam aemulantes. *Ovarium* sessile, ovulis 2 orthotropicis ab apice cavitatis pendulis, in floribus ♀ tantum evolutis, in floribus ♂ valde reductis vel nullis. *Stylus* gracilis, apice clavatus, stigmate terminali punctiformi. *Drupa*. *Exocarpium* coriaceum, sat tenue, saepius cito dissolutum, interdum subpersistens. *Mesocarpium* e fibris radialibus submollibus numerosissimis formatum, persistens, rarius cito dissolutum vel ± reductum. *Endocarpium* durum, certe in parte interiore lignescens, crassum vel rarius tenue, extus reticulato-lacunosum, interdum loco lacunorum reticulato-perforatum. *Semen* 1 subglobosum (vel semina 2 hemisphaerica), in superiore dimidio rugulosum. *Testa* tenuis. *Cotyledones* magni, carnosi.

Type species: *H. velutina* (Prain) Sleum. — Distribution: 7 species in Assam, Burma, Indochina, SW. and S. China, Siam, Sumatra, Malay Peninsula, Java, Borneo, Palawan, Mindanao.

The genus combines certain characters of *Helicia* Lour. (anthers sessile) with those of *Macadamia* F. v. M. (ovules orthotropous, pendent from the top of the cavity), but is very different from both by the dioecia, the peculiar differentiation of the pericarp and a manifestly "reticulate" pollen. It is by this special surface of the exine, that specimens with ♂ flowers easily can be recognized as belonging to the genus.

There are incomplete materials from W. and E. Sumatra, the Malay Peninsula and Borneo, among which are two or three not yet described species.

Clavis specierum

1. Exocarpium coriaceum, sat tenue, persistens. Mesocarpium fibrosum, ± reductum, cito dissolutum. Endocarpium c. 0.5 mm crassum, sublignoso-coriaceum, firmum, extus grosse leviterque reticulato-lacunosum. — *Assam, Burma, Indochina, Yunnan, Kwangsi, Hainan, Siam* . . . . **1. H. terminalis** (Kurz) Sleum.
1. Exocarpium subcoriaceum vel coriaceum, tenue, plerumque cito dissolutum. Mesocarpium valde manifestum, persistens, e fibris numerosissimis radialibus formatum. Endocarpium 1—3 mm crassum, ± lignescens, durum, extus grosse profundeque reticulato-lacunosum. loco lacunarum interdum perforato 2
2. Bracteae lineares, 6—8(—10) mm longae, ± 0.5 mm latae 3

2. Bracteae subulatae, 1—2 mm longae 4
3. Folia chartacea vel subcoriacea, costa excepta glabra, in sicco plumbeo-viridia. — *Malay Peninsula, Borneo* . . . . **2. H. velutina** (Prain) Sleum.
3. Folia coriacea, supra glabra, subtus per faciem breviter rufescenti-pilosa. — *Malay Peninsula* . . . . **3. H. rufidula** Sleum.
4. Flores sessiles vel subsessiles, pedicellis usque ad 1.5 mm longis. Folia subtus diutus breviter rufo-pilosa — *Hainan, Kwangsi* . . **4. H. lobata** (Merr.) Sleum.
4. Flores 3—6(—8) mm pedicellati. Folia ab initio glabra vel cito glabrescentia . 5
5. Perianthium 14—15 mm longum. — *Borneo, Palawan, Mindanao* **5. H. artocarpoides** (Elm.) Sleum.
5. Perianthium 8—10 mm longum 6
6. Folia simplicia lanceolata vel oblongo-lanceolata, apice basique acuta. — *Java* **6. H. lanceolata** (K. & V.) Sleum.
6. Folia simplicia oblanceolata vel plerumque ± late obovato-oblonga, apice breviter et ± obtuse attenuata. — *Sumatra, Java* . . **7. H. incisa** (K. & V.) Sleum.

1. H. terminalis (Kurz) Sleum. comb. nov. — *Helicia terminalis* Kurz, For. Fl. Br. Burma 2, 1877, 312; Hook. f. in Hook. f., Fl. Br. Ind. 5, 1886, 190; Forbes & Hemsl., J. Linn. Soc. Bot. 26, 1891, 394; Ridl., J. Fed. Mal. Stat. Mus. 10 (1920) 113. — *H. balansae* Lec., Not. Syst. 1, 1910, 189; Fl. Gén. I. C. 5, 1914, 164, fig. 14(6). — *H. henryi* Diels in Fedde, Rep. 13, 1915, 528; Merr., Lingn. Sci. J. 13, 1934, 56; Tanaka & Odash., J. Soc. Trop. Agr. 10, 1938, 364; Li, J. Arn. Arb. 24, 1943, 363; Masam., Fl. Kainant. 1943, 63. — *H. pallidiflora* W. W. Smith, Not. Bot. Gard. Edinb. 10, 1918, 179.

Arbor (4—)8—10(—15) m alta, trunco 0.25—1.5 m diam., cortice cinereo vel castaneo. *Rami* castanei. *Ramuli* apicibus resp. innovationibus rufo-tomentelli, ceterum cito glabrescentes corticeque griseo obtecti. *Folia simplicia* oblanceolata rarius oblonga vel obovato-oblonga, apice breviter subabrupte acuminata, subacuta, vel obtuse attenuata, interdum retusa, mucrone apicali instructa, basi in petiolum cuneata et in superiore petioli tertio ± decurrentia, novella papyracea, in sicco nigrescentia, matura subcoriacea, in vivo supra saturate viridia, subtus pallidiora, in sicco olivacea vel utrinque vel subtus tantum nigrescentia, utrinque nitida, glaberrima, integra, interdum subundulata, (10—)12—25(—35) cm longa, (4—)5—8 (rarissime usque ad 10) cm lata, costa utrinque imprimis subtus prominente, nervis lateralibus utroque latere 7—10 (rarius usque ad 14), ascendentibus, inferne rectiusculis denique ante marginem arcuato-conjunctis, aliis intercalaribus minus distinctis pluribus additis, omnibus supra parum sed manifeste, subtus distinctius prominentibus, venis venulisque utrinque rete densum prominulum formantibus; petiolus glaber sat crassus, (1—)1.5—2(—3) cm longus, basi incrassatus. *Folia pinnatisecta* glabra, nitidula, 35—60 cm longa, 18—25 cm lata, utroque latere ± profunde, sed nunquam usque ad costam 3—5-lobata, lobis ± anguste oblongis 8—18 cm longis, 2—3 cm latis, acuminatis; petiolus crassus 2—8 cm longus. *Racemi* ex axillis foliorum delapsorum orti, sat graciles, ± penduli, solitarii vel rarius gemini, sat laxiflori, pedunculo 1—2 cm longo incluso (8—)15—20(—35) cm longi. *Rhachis* laxe pilis ferrugineis minutis adspersa, in sicco nigrescens, c. 1.5 mm diam. *Bracteae* subulatae ± persistentes, c. 1—1.5 mm longae; bracteolae similes, breviores. *Pedicelli* sat dense minuteque ferrugineo- pilosi, rarius ab initio glabri, plerumque bini et $^1/_3$ usque $^1/_2$ long. connati, sub anthesi (4—)6—8 mm longi. *Perianthium* albidum vel ochroleucum, in sicco nigrescens, fragrans, subdense vel plerumque laxe adpresse rufo-ferrugineo-pilosulum, haud raro glabrescens, vel ab initio subglabrum rarius omnino glabrum, 12—14 mm longum, tubo 0.8—1 mm diam., limbo late ellipsoideo ± 2 mm diam. *Antherae* 2.5 mm longae. *Glandulae hypogynae* liberae, ovato-oblongae, paullo distantes. *Ovarium* glabrum. *Fructus* ellipsoideus, parum compressus, apice basique breviter attenuatus, brevissime apiculatus, forma olivae, laevis, immaturus pruinosus, maturus viridis vel atrocaeruleus, in sicco brunneus vel nigrescens, 3—4 cm longus, 2—2.5 cm crassus. Exocarpium coriaceum, 0.5 mm crassum; mesocarpium spongioso-fibrosum 0.3—1 mm crassum, in fructu plane maturo iam ± dissolutum; endocarpium lignescens, tenue, fragile, 0.5 mm crassum, extus reticulato-lacunosum. Semen ellipsoideum. Pedicellus fructiferus 6—7(—10) mm longus, 2—3 mm crassus.

ASSAM. Garo Hills, c. 1200 m: *Parry 804.* Lushai hills, c. 1000 m: *Parry 104, 519, 602, 687.*

UPPER BURMA. Ava (near Maymyo, c. 22°—96°), Kakhyen hills: *Kurz* (*typus H. termin.*, haud vidi, not in CAL). Maymyo plateau, c. 1000 m: *Lace 5799*, c. fr.; ibid.: *Badal Khan.* Pyinmana: *Robertson.* Ruby Mines: *Abdul Huk 205.*

LOWER BURMA. Tenasserim, Panchong, c. 1200 m: *Gallatly 678.* Mergui, Sandawat: *Lace 4800*; Thaton, Dawna Range, c. 1370 m: *Lace.*

CHINA. Yunnan. Poneshee: *Anderson.* Szemao, c. 1500 m: *Henry 11910, 11910A* (B, *typus H. henryi*; E, *typus H. pallidifl.*; K, NY), *11910B, 11910C.* Sine loco: *Tsiang 12883.* Kwangsi. Bako Shan, 900 m: *Ching 7418.* Dar Shan, S. Nanning, 900 m: *Ching 8032.* Shap Man Taai Shan: *Tsang 22324.* Hainan. *Liang 62538, McClure 7817, 7909, 8390, 9640, 20105, How 72353, 73100, 73856.*

INDOCHINA. Tonkin. Mon-cay: *Tsang 26961.* Taai Wong Mo Shan: *Tsang 27078, 27252, 29299.* Sontay, Mt Bavi, 700 m: *Fleury* (Herb. *Chevalier 37825*), *Balansa 3803* (K; P, *lecto-typus H. balansae*), *3804.* Annam. *J. & M. Clemens 3507, 4244, 4326.* Nhatrang, Phu-Hu: *Poilane 5249.* Cambodge: *Harmand a. 1876/77.*

SIAM. Pitsanulok, Petchabun, 600 m: *R. For. Dep. 4850.* Udawn, Dan Sai, 1500 m: *Kerr 5781.* Rachaburi, Kanburi, 1400 m: *Kerr 10408*; Ranawng: *Kerr 16852.* Puket, Takuapa, 1500 m: *Kerr 17051.* W. Coast and islands, Tapli: *B. Kloss 6815.*

2. H. velutina (Prain) Sleum. comb. nov. — *Helicia velutina* Prain, Kew Bull. 1912, 343; Gamble, J. As. Soc. Beng. 75, ii, 1914, 346; Ridl., Fl. Mal. Pen. 3, 1924, 143.

Arbor, (8—)12—23 m alta, trunco 20—35 cm diam., cortice griseobrunnescenti, laevi, pro parte irregulariter erumpente lenticellisque parvis albescentibus obtecto. *Ramuli* recentissimi rufo-tomentosi, annotini glabrati, in sicco brunnescentes vel cinerascentes, striati, teretes. *Folia simplicia* oblonga vel ± late oblanceolata, apice breviter (1.5—2 cm) sat abrupte subcuspidato-acuminata, acutiuscula, acumine saepius paullo curvata, basi in petiolum cuneata paulloque decurrentia, rigide chartacea vel subcoriacea, in vivo laete viridia valde nitida, in sicco supra flavido-olivacea vel plumbea, subtus plumbea vel brunnescenti-plumbea, utrinque nitidula, integra, costa imprimis subtus parcepilosa excepta glabra, (10—)14—22 cm longa, (3—)4—7 cm lata, costa utrinque prominente, nervis lateralibus utroque latere 12—14(—16) inferne rectiusculis superne curvatis interque sese ± parallelis, manifeste ante marginem anastomosantibus, intercalaribus pluribus brevioribus minus distinctis, omnibus supra prominulis vel saepius leviter immersis, subtus bene elevatis, venis venulisque sat laxe irregulariter reticulatis utrinque parum prominulis; petiolus (1.2—)1.5—2(—3) cm longus, c. 2 mm crassus, initio rufo-tomentosus, demum glabrescens, basi arcte pulvinato-incrassatus. *Folia lobata* vel pinnata adhuc ignota. *Racemi* axillaris vel saepius e nodis annotinis ± defoliatis orti, singuli vel rarius bini, fere ad basin densiflori, (6—)7—12 cm longi, omnino rufo-tomentosi. *Rhachis* in specim. ♂♂ c. 1.5 mm, in specim. ♀♀ c. 2—2.5 mm diam. *Bracteae* lineares (6—)8—10 mm longae, 0.4—0.8 mm latae, subpersistentes; bracteolae 4—5 mm longae. *Pedicelli* crassiusculi, 4—5 mm longi, plerumque bini, liberi vel usque ad medium connati. *Perianthium* flavescenti- vel viridescenti-albidum, inodorum, rufo-ferrugineo-tomentosum, apice subglabrescens, 10—12 mm longum, tubo in fl. ♂♂ c. 0.6 mm, in fl. ♀♀ c. 1.5 mm diam., limbo clavato 2—2.5 mm diam. *Antherae* c. 2 mm longae. *Glandulae hypogynae* parvae, late obovato-truncatae, liberae, paullo distantes. *Ovarium* glabrum. *Fructus* cylindrico-ellipsoideus, paullo complanatus, in sicco brunneus, c. 4 cm longus, c. 2.5 cm latus, c. 2 cm crassus. Exocarpium coriaceum 1—2 mm crassum; mesocarpium fibrosum, in sicco irregulariter fissum, 2—3 mm crassum; endocarpium lignosum 1—2 mm crassum. Semen haud visum. Pedicellus fructiferus 0.8—1 cm longus, 3 mm crassus.

Malay Peninsula. Perak, Larut, Gunong Bubu, open jungle, 600—750 m, fl. buds: *Kunstler 7316* (K, *typus*). Johore, 3rd mile Mawai-Jemaluang road, low, fl. ♀: *Corner SF 37097.*

Borneo. Br. N. Borneo. Tawao, Elphinstone prov.: *Elmer 21674.* S E. Borneo. E. Kutei, Sangkulirang, 50 m: *NIFS bb. 11929*; Muan region near Sg. Riko, Balikpapan Bay, 20 m: *Kostermans 4364,* fl. ♂.

3. **H. rufidula** Sleum. sp. nov.

Arbor (8—)15—35 m alta, trunco usque ad 0.9 m diam., cortice laevi, griseo, lamuloso-deciduo. *Ramuli* subteretes, recentissimi saturate fusco-tomentosi, vetustiores glabri cinerascentes. *Folia simplicia* obovata vel late obovato-oblonga, apice (sub)rotundata vel latissime ± obtuse attenuata, basi in petiolum cuneata, coriacea, in sicco saturate castanea, supra nitida costaque excepta glaberrima, subtus opaca et per totam faciem aequaliter, in costa et nervis densius breviter rufo-pilosa, integra, (12—)15—28 cm longa, (6—)7—13 cm lata, costa supra vix, subtus crasse prominente, nervis lateralibus utroque latere 14—18 rectis inter sese ± parallelis a costa angulo c. 45° abeuntibus, ante marginem inter sese arcte curvato-conjunctis, ceteris brevioribus pluribus intermixtis, omnibus supra leviter, subtus manifeste prominentibus, venis venulisque irregulariter denseque areolatis utrinque parum sed distincte elevatis; petiolus paullo applanatus, initio rufo-tomentosus, glabrescens, (1—)1.5—3 cm longus, c. 2—3 mm crassus, basi incrassatus, in superiore tertio laminae decurrente alatus. *Folia pinnatisecta* utroque latere 3—4-loba, lamina c. 55 cm longa, c. 35 cm lata, lobis 12—18 cm longis et 5—8 cm latis, supra glabra, lucida, subtus sat dense breviter rufo-tomentosa, partim glabrescentia, in sicco subtus brunneo-subnigrescentia; petiolus c. 11 cm longus, 5—6 mm crassus. *Flores* adhuc ignoti. *Infructescentiae* e ligno vetere ortae, 8—15 cm longae. *Rhachis* striata, subdense rufo-pilosula, 2—3 mm diam. *Bracteae* lineares c. 6 mm longi, subpersistentes. *Pedicelli* c. 8 mm longi, 2—3 mm diam. *Fructus* maturus cylindrico-ellipsoideus, in vivo ruber, 3.5—4 cm longus, c. 2.5 cm latus, c. 2 mm crassus. Exocarpium coriaceum 0.5—1 mm crassum; mesocarpium radiato-fibrosum, in sicco irregulariter fissum, c. 3 mm crassum; endocarpium lignescens c. 1 mm crassum.

Malay Peninsula. Perak. Trolak For. Res., flatland, 45 m: *For. Dep. F. M. S. 43457 Browne* (KEP, *typus*) fr. II-37. Parit For. Res.: *For. Dep. F. M. S. 39487*; Kroh

For. Res., Compt. 27: *For. Dep. F.M.S. 31047*; ibid., Compt. 52: *For. Dep. F.M.S. 28724*. Pahang. Kuantan, Bukit Goh Res.: *For. Dep. F.M.S. 29666*. Selangor, Ulu Gombak-Kuala Lumpur: *For. Dep. F.M.S. 36631*. Bukit Cheraka For. Res., Compt. 27: *For. Dep. F.M.S. 41853*. Sungei Buloh For. Res.: *For. Dep. F.M.S. 14914, 15292*. Kanching: *For. Dep. F.M.S. 24852* (SING).

4. **H. lobata** (Merr.) Sleum. comb. nov. — *Helicia lobata* Merr., Lingn. Sci. J. 6, 1930, 276; Tanaka & Odash., J. Soc. Trop. Agr. 10, 1939, 364; Chun, Sunyatsenia 4, 1940, 184; Masam., Fl. Kaitan. 1943, 63.

Arbor 6—8(—15) m alta, cortice cinereo. *Ramuli* apicibus ± dense rufo-tomentelli ceterum glabrati, in partibus vetustioribus cortice cinereo obtecti. *Folia simplicia* oblonga vel elliptico-oblonga, apice breviter obtuse acuminata, basi in petiolum cuneata, subcoriacea, in sicco (rubro-)brunnea, subtus paullo pallidiora, integra, novella utrinque ± dense rufo-pilosa, cito costa utrinque ± excepta glabrata, matura utrinque subnitida, (8—)10—17 cm longa, (3.5—)4—7 cm lata, costa supra fere plana, subtus valida, nervis lateralibus (10—)12—14, angulo c. 45° a costa abeuntibus, inter sese et cum ceteris intercalaribus ± parallelis ante marginem obsolete curvato-conjunctis, utrinque parum sed distincte elevatis, venis venulisque utrinque sat dense reticulato-prominulis; petiolus sat gracilis, (1—)2—4 cm longus. *Folia pinnata* quam simplicia maiora, 20—40 cm longa, usque ad 20 cm lata, utroque latere 2—5(—8)-lobata, lobis integris, oblongis, acuminatis vel obtusis, contiguis, 6—11 cm longis, 2—4 cm latis, subtus initio laxe rufo-pubescentia demum omnino glabrescentia, sicut folia simplicia dense reticulata; petiolus crassus, 0.5—5 (rarius usque ad 10) cm longus. *Racemi* densiflori e ligno vetere, id est ramulis defoliatis orti, in rhachide et in pedicellis dense, ad perianthia subdense usque laxe rufo-pilosi, in speciminibus ♂♂ tantum visi. *Rhachis* gracilis c. 1 mm diam. *Pedicelli* crassiusculi, liberi, 1—1.5 mm longi, basi minutissime bracteati. *Perianthium* c. 12 mm longus, tubo c. 1 mm diam., limbo ellipsoideo fere 2 mm diam. *Glandulae hypogynae* ovato-oblongae, liberae, satis approximatae. *Ovarium* rudimentarium glabrum. *Flores* ♀♀ haud visi. *Fructus* ellipsoideus, laevis, nitidus, in vivo viridis, in sicco castaneus, c. 7—8 cm longus, 5—6 cm crassus. Exocarpium coriaceum partim cito lamellosum, 1—2 mm crassum; mesocarpium radiato-fibrosum, irregulariter fissum, molle, 2—3(—4) mm crassum; endocarpium parum reticulato-lacunosum, 3—4(—5) mm crassum, in parte exteriore (2—3 mm) ± fibrosum, in parte interiore (1—1.5 mm) lignosum et durum. Semen unicum ellipsoideum.

China. Hainan. Noh Pong Shan, Tiu Keng Shue (Taam-chau distr.): *Tsang 846* (Lingn. Univ. Herb. 16345: A; NY, *typus*, S), fr. Chim Shan: *Fung 20133*, fl. ♂. Sine loco: *Wang 36321*. Kwangsi. Lungchow, Ta-Ching Shan: *Liang 65834*, cit. Chun, haud vidi.

5. **H. artocarpoides** (Elm.) Sleum. comb. nov. — *Helicia artocarpoides* Elm., Leafl. Philip. Bot. 5, 1913, 1826; Merr., En. Philip. 2, 1923, 99; Pl. Elm. Born. 1929, 52.

Arbor parva, gracilis, usque ad 15 m alta, vel frutex arborescens, trunco ± torquato, cortice brunneo vel griseo, lenticellis rotundis et ellipticis rarius elongatis subdense pustulato. *Ramuli* juveniles rufo-tomentelli, cito glabrescentes, vetustiores striati. *Folia simplicia* oblonga vel obovato-oblonga, apicem versus sensim breviter attenuata, obtusa vel rotundata, basi in petiolum cuneata et paullo decurrentia, ± coriacea, in sicco dilute rarius saturate castanea, interdum nigrescentia, subnitentia, glabra, integra, 30—40 (vel plus ?) cm longa, 9—12.5 cm lata, costa supra bene, subtus valde prominente, nervis lateralibus utroque latere 14—16 leviter curvatis inter sese subparallelis praeter marginem excurrentibus, superioribus parum distincte curvato-anastomosantibus, supra minute, subtus alte prominentibus, venis a nervis rectiuscule abeuntibus inter sese subparallelis utrinque priminulis, venulis imprimis subtus sat dense reticulatis et parum elevatis; petiolus glaber 8—14 cm longus, basi ipsa incrassatus et curvatus. *Folia pinnatisecta* in speciminibus junioribus saepius ad apicem trunci congesta et ± horizontaliter patentia, in sicco saturate brunnea, utrinque reticulata, integra, glabra, nitentia, usque ad 90 cm longa, lobis in utroque latere 5—8 anguste oblongis vel oblanceolatis vel obovato-oblongis, breviter acuminatis, 15—30 cm longis, 3—18 cm latis, sinubus ± rotundatis, plerumque a costa primaria 1.5—3 cm distantibus, rarius usque fere ad costam primariam productis, nervis lateralibus 10—15 plerumque rectis praeter marginem curvatis ibique in nervum intramarginalem ± distinctum collectis; petiolus 3—5 mm crassus, initio rufo-pubescens, demum glabrescens, vel glaber, (6—)10—18 cm longus. *Racemi* solitarii rarius plures (ad 10) e ramulis validis vel e trunci tuberculis orti, (5—)15—30(—60) cm longi, ± densiflori, in rhachide et pedicellis dense, in perianthiis subdense breviter adpresse ferrugineo-pilosi. *Rhachis* 1.5—2.5(—3) mm diam. *Bracteae* minutae, lanceolatae, 0.5—1 mm longae, ± caducae. *Pedicelli* plerumque bini, (3—)5—7(—8) mm longi, sat graciles, usque ad $^2/_3$ long. connati. *Perianthium* fragrans, albidum vel flavidum, 14—15 mm longum, tubo in fl. ♂♂ 0.8—1 mm, in fl. ♀♀ c. 1.5 mm diam., limbo clavato 1.5—2.2 mm diam. *Antherae* 2—2.5 mm longae. *Glandulae hypogynae* ovato-oblongae, liberae, ± approximatae itaque cupulam aemulantes. *Ovarium* glabrum. *Fructus* in vivo saturate flavidus, ellipsoideo-cylindricus, (3—)4—4.5 cm longus, (2—)2.5—3 cm diam., laevis, nitidus. Exocarpium tenue, coriaceum; mesocarpium fibrosum c. 3 mm crassum; endocarpium lignescens, reticulato-lacunosum, c. 1 mm crassum.

PHILIPPINES . Palawan. Puerto Princessa, Mt Pulgar, forest-ridge, c. 600 m: *Elmer 12946* (A, B, BM, BO, E, L, M; NY; PNH †, *typus*). Mindanao. Zamboanga, Malangas: *B. S. 37448 Ramos & Edaño.*

BORNEO. Br. N. Borneo. Sandakan, Elopura: *Br. N. B. For. Dep. 1626, 10016, 10041, 10659.* Kinabatangan: *Evangelista 999.* Tawao: *Elmer 21372.* Mt Kinabalu, c. 1000 m: *J. & M. Clemens 27390.* Sarawak: *Haviland & Hose 1585, 3199.* S E. Borneo. W. Kutei, 200—500 m: *Endert 2876, 4097.* Sg. Bluu: *Jaheri 447.* Sine loco: *Jaheri 174.*

Apparently not present in the Malay Peninsula; sterile material from the Malay Peninsula which is similar but not identical in leaf-characters, is deposited in Herb. Singapore.

6. H. lanceolata (K. & V.) Sleum. comb. nov. — *Helicia lanceolata* K. & V., Bull. Inst. Bot. Btzg 2, 1899, 10; Bijdr. Booms. Java 5, 1900, 320; Koord,, Nat. Tijd. Ned. Ind. 60, 1901, 389; Exk. Fl. Java 2, 1912, 154; Atl. Baumart. Java 1915, t. 598; Back., Bekn. Fl. Java em. ed. IV A, 1942, fam. 79, p. 5, nec Bak. f., J. Bot. 63, 1925, Suppl. 89 (= *Helicia attenuata*).

Arbor, 15—27 m, trunco erecto 25—45(—60) cm diam. *Ramuli* teretiusculi, striati, initio ± dense pilis rufescentibus adpressis induti mox glabrescentes et griseo-corticati. *Folia* simplicia adhuc cognita, lanceolata vel oblongo-lanceolata, apice sensim acuminata et acuta, basi in petiolum cuneata paulloque decurrentia, in vivo saturate viridia, subtus pallidiora, utrinque nitida, in sicco saturate brunnea vel nigrescentia, firmule subcoriacea, integra, glabra, 10—16(—23) cm longa, (2.2—)3.5—5(—8) cm lata, costa utrinque prominente, nervis lateralibus utroque latere (6—)8—10 in inferiore parte rectiusculis, marginem versus curvatis inteque sese manifeste anastomosantibus, utrinque prominentibus, venis venulisque dense reticulato-prominulis; petiolus glaber, basi paullo incrassatus, 1—2(—5) cm longus. *Racemi* ♂♂ tantum cogniti, ex axillis superioribus defoliatis orti, solitarii, 12—26(—30) cm longi, ascendentes, rigidiusculi, laxe floriferi, ad rhachidem et pedicellos subdense, ad perianthium laxe pilis rufis minutis adpressis obsiti. *Rhachis* 1—2 mm diam. *Bracteae* subulatae, 1—2 mm longae, ± caducae. *Pedicelli* plerumque gemini, $^1/_2$—$^4/_5$ long. connati, crassiusculi, (2—)3—4 mm longi. *Perianthium* 8—10 mm longum, demum glabrescens, in vivo pallide virescenti-lutescens. *Antherae* c. 2 mm longae. *Glandulae hypogynae* fere rotundae, liberae, approximatae. *Ovarium* glabrum. Cetera ignota.

JAVA. Preanger. Takoka: *Koorders 4528, 6235* (fl. ♂, BO, *lecto-typus*; L), *12155, 25547, 39554* (all these numbers from the same tree *2095* alpha); ibid.; *Koorders 6244*. Bondung, Tjiguludug, 1050 m: *JA. 1503*. Pekalongan. NW G. Prahu, Surdjo: *Koorders 11038*. Besuki. Tjoramanis: *Koorders 10054, 20939*. — Cult. *Hort. Bog. III. B. 11.*

7. H. incisa (K. & V.) Sleum. comb. nov. — *Helicia incisa* K. & V., Bull. Inst. Bot. Btzg 2, 1899, 10; Bijdr. Booms. Java 5, 1900, 317; Koord., Nat. Tijd. Ned. Ind. 60, 1901, 389; Exk. Fl. Java 2, 1912, 154; Atl. Baumart. Java 1915, t. 599, 600; Back., Bekn. Fl. Java em. ed. IV A, 1942, fam. 79, p. 6. — *Artocarpus chaphasha* ? Roxb. ex Koord.-Schum., Syst. Verz. 2, 1910, 16.

Arbor usque ad 15 m alta, trunco c. 25 cm diam., cortice griseo, fragili. *Ramuli* crassi, in sicco castanei, longitudinaliter sulcati, ad nodos dilatati, apicibus rufo-puberuli, ceterum mox glabrescentes. *Folia simplicia* oblanceolata vel plerumque ± late obovato-oblonga, apice late obtuse acuminata subrotundata, basin versus cuneata, subcoriacea, in sicco brunnescentia, nitentia, integra, glabra, (15—)20—30(—45) cm longa, (5—)7—12 cm lata, costa supra parum, subtus crasse prominente, nervis lateralibus utroque latere 6—9(—10, raro usque ad 12) a costa angulo c. 30° abeuntibus, erecto-curvatis, praeter marginem indistincte arcuato-conjunctis, aliis intercalaribus paucis vel nullis, omnibus supra parum, subtus manifeste prominentibus, venis venulisque rete sat densum utrinque prominulum formantibus; petiolus 1.5—2.5 mm crassus, striatus, in sicco nigrescens, glaber, (1.5—)2—4 (—5.5) cm longus, sed in foliis summis interdum subnullus. *Folia tripartita* usque *pinnatisecta* in arboribus juvenilibus observata magna, usque ad 1 m longa et usque ad 60 cm lata, segmentis utrinque 1—5 cum lobo terminali oblongis vel superioribus ovatis, apice breviter acuminatis vel obtusis, sinubus ± rotundatis a costa primaria c. 2.5 cm distantibus, basin versus attenuata, ima basi contracta, sicut simplicia utrinque dense reticulato-venosa, glaberrima; petiolus valde crassus, 0.5—2(—5) cm longus interdum nullus. *Racemi* ♂♂ tantum cogniti, axillares vel e ligno vetere orti, solitarii vel 2—3-fasciculati, (15—)30—40 cm longi. *Rhachis* c. 1.5 mm crassa, sicut pedicelli laxe adpresse ferrugineo-pilosa. *Bracteae* ovato-lanceolatae minutae. *Pedicelli* graciles 3(—4) mm longi. *Perianthium* in fl. ♂♂ 8—10 mm longum, laxe adpresse ferrugineo-pilosum, tubo 0.6 mm diam., limbo clavato 1.5 mm diam. *Antherae* c. 3 mm longae. *Glandulae hypogynae* late triangulares, obtusae, liberae. *Ovarium* pilis paucis adspersum vel glabrum. *Fructus* (specimen sumatranum) compresso-ellipsoideus, c. 6 cm longus, 4 cm latus, 2.5 cm crassus. Exocarpium coriaceum tenue; mesocarpium fibrosum c. 3 mm crassum; endocarpium lignescens, durum, c. 2—3 mm crassum, irregulariter reticulato-lacunosum, loco lacunarum perforatum.

SUMATRA. Eastcoast. R. Kampar Kiri: *Anon.*, comm. *Heyne* (*381*, BO *140926—28*, *140934*, fol. simpl., fl., fr.. S. Sigati, biv. Tassi, 30 m: *Koorders 10456*. Palembang. R. Rawas: *Anon*, comm. *Heyne* (*425*, BO, fol. pinn.). Lampong. Kota Agung, 600 m, rather rare: *Gusdorf 272* (BO, fol. simpl.).

JAVA. Banjumas. Pringombo, 700—1000 m: *Koorders 6260* (BO, *lecto-typus*, ster., fol. pinn.; K, L), *11819*, *12200*, *21895* (these three from the same tree as *6260*), *27100*, *27101*, *27144*, *33951*, *36649*, *37942*, *37949*, *39066—69*, *39072—76*, *39163*, *39173*. Besuki. Tjoramanis, 700 m: *Koorders 6277*.

Index to collectors' numbers

Abdul Huk 104: V-79; 203: V-79; 205: VI-1; Achmad 936: V-34; 962: V-34; 1090: V-34; 1192: V-34; 1555: V 34; Agullana 3881: V-65; Ahern's coll. FB 1510: V-65; 2670: V-65; 3098: V-65; Ahmad Garden nr 1219: V-77; Alcasio & Edaño PNH 4507: V-65; 5038: V-65; d'Alleizette s.n.: V-66, 87; Alvins 3301: V-69; Amdjah 281: V-69; Anderson s.n.: VI-1; 1016: V-79; Anon. comm. Heyne 381: VI-7; 425: VI-7; Anta 229: V-30; Arsin s.n.: V-65.

Backer 170: V-65; 3669: V-69; 4146: V-65; 6054: V-65; 11081: V-33; 12410: V-69; 12437: V-65; 17065: V-65; 18657: V-69; 22500: V-65; 22655: V-65; 23281: V-65; 23457: V-65; 25889: V-65; Backer & Posthumus s.n.: V-69; Badal Khan s.n.: VI-1; 14: V-79; 63: V-79; 261: V-79; Bailey s.n.: II-1, 9, V-1a, 1b, 4, 6, 8; Bailey & Simmonds s.n.: V-5a; Baker s.n.: V-5a; Bakhuizen van den Brink 1509: V-65; 2075: V-69; 2801: V-69; 2825: V-65; 3698: V-65; 3855: V-65; Bal 16: V-65; Balansa 2293: II-5; 3802: V-87; 3803: VI-1; 3804: VI-1; 3805: V-67; 5417: V-87; Barber (Motley) 242: V-77; Bartlett 7116: V-69; 7385: V-69; 7598: V-69; 8064: V-69; Batten Pooll s.n.: V-69; K 2: V-34; Bauerlen s.n.: V-1, 9; Beccari s.n.: V-19; 3216: V-34; PB 3609: V-77a; PS 344: V-65; 363: V-65; 499: V-65; 711: V-65; Beckler s.n.: II-8, V-5; Beddome s.n.: V-65, 79; Beguin 1304: V-52; 1542: V-52; Béjaud 839: V-34; Berkhout 36: V-65; Beumée A 106: V-69; Binnendijk s.n.: V-52; Biswas 4012: V-79; Blake 9891: V-1a; 12415: V-4; Bleeser 860: V-3; Blokhuis 49: V-69; Blume s.n.: V-65; Boerlage s.n.: V-65; Bon 1613: V-87; 5417: V-87; Boonkird 46: V-65; Boorman s.n.: V-1; Bor 4497: V-79; Borden FB 836: V-65; 1235: V-65; 1354: V-65; 2076: V-65; 3060: V-65; Bosscha s.n.: V-34; Brandis 1380: V-73; 1408: V-73; Brass 574: V-35; 1490: V-29; 2105: V-8; 2135: II-1; 2219: V-8; 3891: V-25; 4535: V-83; 4717 V-83; 5063: V-20; 7704: V-30; 7919: V-30; 8013: V-12; 8494: V-30; 8554: V-30; 10768: V-46; 12728: V-59; Brass & Versteegh 12588: V-52; Britton PNH 19467: V-65; Br. N. B. For. Dep. 1626: VI-5; 1741: V-65; 2529: V-33; 2966: V-65; 4586: V-34; 10016: VI-5; 10041: VI-5; 10345: V-34; 10488: V-65; 10659: VI-5; 10665: V-65; 38808: V-69; A 3627: V-69; 4446: V-69; 4529: V-69; 4651: V-33; Brooks s.n.: V-65; Bruggeman 3434: V-33; Buchanan 34: V-79; Buchanan-Hamilton 432: V-65; Büsgen 161: V-69; Bünnemeijer 915a: V-33a; 1602: V-65; 1843: V-65; 2622: V-69; 11934: V-47; 12152: V-47; 12320: V-47; 12391: V-47; Burck 381: V-65; Burkill R. E. P. 32281: V-79; 36926: V-79; Burkill & Banerjee 133: V-79; 293: V-79; Burkill & Haniff SF 16684: V-69.

Camfield s.n.: V-9; Canton Chr. Coll. 433: V-87; 1540bis: V-87; 1556 (Levine): V-87a; 1917: V-87; 2093 (Levine): V-87a; 3050: V-87; 3069 (Levine): V-87a; 3433: V-87; 3463: V-87; 6290: V-87; 12456: V-87b; 12612: V-87b; 12690: V-87; Carr s.n.: V-4; 13436: V-32; 13508: V-20; 13744: V-71; 13761: V-57; 14148: V-20; 14378: V-20; 15210: V-48; 15236: V-71; 15473: V-76; 15493: V-76; 15579: V-18; 15817: V-20; SF 26710: V-16; 27146: V-39; 27155: V-39; 27786 V-69; 27885: V-34; Carron s.n.: V-5; Carter E. B. 750: V-79; Castro 4432: V-69; Cenarbre & Agelar FB 28879: V-65; Cheng 2673: V-87; Chevalier 31267: V-87; 38898: V-28; 40566: V-79; 40575: V-79; Ching 2248: V-87; 5628: V-87a; 6001: V-87a; 7196: V-87a; 7418: VI-1; 7823: V-87; 7867: V-66; 8014: V-87a; 8032: VI-1; 8044: V-87; 8054: V-87; 8192: V-66; 8318: V-87; Chow 1838: V-87: Chun 5830: V-87; 7018: V-87; 7074: V-87; 30425: V-87a; Chun & Tso 43706: V-85; 43741: V-85; 43800: V-66; 43903: V-85; 43937: V-87; 44294: V-85; 44331: V-66; Chung 2240: V-87; 2854: V-87; 4685: V-87; 6461: V-87; 6673: V-87; Clarke 14390: V-79; 14782: V-79; 15423: V-79; 26612: V-79; 28098: V-79; 38164: V-79; 40428: V-79; 43317: V-79; 43685: V-79; 43924: V-79; 44041: V-79; 44176: V-79; Clemens s.n.: V-75, 82; 558: V-65; 1398: V-75; 1425: V-63; 1670: V-63; 1693: V-11; 1790: V-10; 1845: V-11; 2125: V-44; 2248: V-10; 2264: V-11; 2318: V-58; 3487: V-86; 3507: VI-1; 3999: V-75; 4066: V-75; 4136: V-87; 4244: VI-1; 4326: VI-1; 5446: V-58; 5530: V-58; 5595: V-58; 6471: V-75; 6472: V-58; 7695: V-75; 7925: V-10; 7961A: V-10; 8343a: V-49; 8595: V-75; 9433: V-75; 11003a: V-49; 11082: V-43; 11235a: V-49; 11261: V-75; 20386: V-16; 26172: V-34; 26385: V-65; 27083: V-65; 27286: V-69; 27390: VI-5; 27563: V-39; 27586 (27636): V-77; 28070: V-39; 28130: V-34; 28292: V-34; 28724: V-16; 30069: V-65; 30080: V-39; 31865: V-77; 31898: V-43; 32607: V-39; 32711: V-39; 32914: V-77; 33963: V-77; 35111: V-39; 40399: V-77; 50417: V-39; 50759: V-34; 51609: V-69, 77; 55095: V-65a; BS 9107: V-65; Coert s.n.: V-69; 1000: V-33a; 1035: V-33a; 1628: V-69; Collett s.n.: V-79; 726: V-79; Collins 2402: V-65; Compton 362: II-7; Cooper & Bulley 1122: V-79; Corner s.n.: V-17, 65; SF 25965: V-77; 30856: V-17; 37097: VI-2; Cousins 51: V-79; Cowan 144: V-79; 2268: V-34; 2391: V-34; Cowley s.n.: V-2; 74B: V-4; Cubbitt 460: V-79; Cuming 858: V-13; 1262: V-65; 1537: V-65; 2338: V-65; Curtis s.n.: V-77; 1181: V-69; 2372: V-69; 2765: V-69; 3020: V-33.

Dallachy s.n.: III, V-8; Dalziel s.n.: V-87b; Darling FB 14407: V-65; 14499: V-65; Darnton 168: V-65; Derry 456: V-34; 530: V-34; 1202: V-34; Diels 8486: V-8; 8540: V-8; Dillewijn 543: V-69; Dixon s.n.: V-9; Docters van Leeuwen s.n.: V-65, 69; 10354: V-52; 13306: V-33a; Domin s.n.: V-5; Dorgelo 2049: V-33a; S 438: V-69; Duff 7: V-1; Dunn 234: V-87.

Eberhardt 2685: V-66; 2821: V-66; 4129: V-66; 5066: V-66; Edaño BS 41786: V-65; 77817: V-13; 78389: V-13; PNH 11856: V-65; 21949: V-65; 21961: V-65; Elbert 227: V-69; 282: V-33a; 3475: I; 3491: I; Elmer 6092: V-65; 7657: V-65; 7774: V-65; 8346: V-65; 8763: V-65; 8885: V-65; 9223: V-13; 11581: V-65; 11840: V-13; 12946: VI-5; 13392: V-65a; 16444: V-65; 21346: V-34; 21372: VI-5; 21539: V-69; 21674: VI-2; 21817: V-69; Endert 1736: V-65; 2255: V-33; 2306: V-65; 2876: VI-5; 3211: V-33; 3644: V-77; 3877: V-77; 3890: V-16; 3911: V-69; 4097: VI-5; Esguerra s.n.: V-65; FB 31400: V-65; Evangelista 700: V-65; 954: V-65; 999: VI-5; 1074: V-65; Evrard 285: V-79; 1083: V-79; Eyma 4926: V-52; 4946: V-46; 5262: V-50.

Fan & Li 378: V-87; Faurie 1189: V-61; 3807: V-87; 8241 B: V-61; 8245: V-61; Fawcett s.n.: V-1; Fénix BS 12699: V-65; 28067: V-65; Flecker s.n.: V-4; Fleury (Herb. Chevalier 32373): V-66; (Herb. Chevalier 32618): V-87; (Herb. Chevalier 37825): VI-1; Floyd NGF 6497: V-7; Fontanoza BS 31128: V-65; Forbes 80: V-69; 343: V-64; 377: V-65; 387: V-64; 465: V-69; 508: V-33; 670: V-65; 678: V-64; 723: V-64; 799: V-64; 1921: V-69; 2212: V-65; 2731a: V-65; "3047a": V-34; "3079a": V-34; 3097a: V-34; Ford s.n.: V-87; 21: V-87a; 46: V-61; 329: V-87a; For. Dep. F. M. S. 1072: V-77a; 3221 (Foxworthy): V-65; 3762: V-34; 12027: V-69; 12114: V-69; 13367: V-69; 13920: V-34; 13933 (Strugnell): V-69; 14914: VI-3; 15232: V-69; 15233: V-77; 15292: VI-3; 15467: V-65; 16966: V-69; 16988 (Symington): V-69; 17120: V-77a; 20759: V-69; 24852: VI-3; 26793: V-65; 26894: V-65; 27996: V-69; 28724: VI-3; 29666: VI-3; 31047: VI-3; 34285: V-69; 34607: V-65; 36631: VI-3; 37635: V-77; 39487: VI-3; 41853: VI-3; 43418: V-77; 43457 (Browne): VI-3; 44916: V-69; 49006 (S.H. 10232): V-16; Forrest 7852: V-40; 8333: V-78; 8766: V-40; 9455: V-40; 17493: V-78; 17639: V-40; 18204: V-79; 18411: V-78; 24354: V-40; 26107: V-40; 26237: V-78; 26668: V-79;

27167: V-87; 29802: V-78; Forsyth s.n.: V-1; Franc 2023: II-7; Francis s.n.: III; de Fretes 5761: V-52; FRI Ja. 1503: VI-6; 2383: V-33; 2478: V-69; 3014: V-69; 3596: V-33a; Fukien Chr. Univ. 2579: V-87; 5761: V-87; Fung 20133: VI-4.

Gage 77: V-77a; Gallatly 313: V-79; 452: V-79; 546: V-73; 678: VI-1; Galungi 337: V-69; Gamble 628: V-79; 745: V-79; 2305: V-79; 6971: V-79; 9591: V-79; 10265: V-79; 10528: V-79; 15424: V-79; Gammie s.n.: V-79; Gardner s.n.: V-56; Garrett 399: V-61a; 532: V-79; 1179: V-79; Gibbs 3137: V-43; Gomez (Herb. Wallich) 1039: V-65; Goodenough 1388: V-34; 1760: V-34; 2759: V-34; 10472: V-77; Grashoff 718: V-34; 912: V-34; 1143: V-65; Gressitt 250: V-61; 854: V-66; Griffith s.n.: V-34; 183: V-79; 4367 p.p.: V-65; 79; Gusdorf 60: V-65; 272: VI-7; Gyldenstolpe s.n.: V-49.

Haines s.n.: V-79; 1010:V- 79; Hallier 1051: V-33; 1677: V-34; 2385: V-34; 2616: V-77; Handel-Mazz. 307: V-87; 501: V-87; 11045: V-87; 11909: V-87; Haniff SF 9134: V-77; 21033: V-17; Harmand s.n.: VI-1; 184 p.p.: V-34; 1150: V-79; Haslam s.n.: V-39; v. Hasselt s.n.: V-69; 31: V-65; Haviland s.n.: V-77; 1197: V-39; Haviland & Hose 1585: VI-5; 3199: VI-5; 3734: V-77; Hayata 186: V-79; Helfer 50: V-34; 99: V-34; 224: V-34; 4366: V-34; Henderson s.n.: V-1; SF 10210: V-69; 11104: V-69; 22045: V-69; 23277: V-69; 23388 V-17; 23641: V-77a; 29561: V-69; Henry s.n.: V-87; 511: V-61; 805: V-61; 805a: V-61; 819: V-87; 1225: V-61; 10704: V-42; 10756: V-87; 11383: V-79; 11910: VI-1; 11910a: VI-1; 11910b: VI-1; 11910c: VI-1; 11935: V-79; 11935a: V-79; 12159: V-27; 12315: V-87; 12315a: V-87; 12315b: V-87; 12808: V-73; 12858: V-79; 13075: V-72; Hervey s.n.: V-65; Hill s.n.: II-8; Ho 60062: V-87a; Hoffmannsegg s.n.: V-69; Holttum SF 20743: V-69; 24761: V-69; Hoogland 3638: V-64; Hooker s.n.: V-79; Hooker f. & Thomson s.n.: V-34, 79; Horsfield s.n.: V-65, 69; Hort. Bog. III. B. 11: VI-6; IV-F-22: V-52; IX-D-55: V-52; IX-D-57: V-52; IX-D-71: V-52; Hose 217: V-77; 531: V-77; Hosseus 357: V-79; Houter 191: V-65; How 71730: V-66; 72353: VI-1; 72404: V-66; 73005: V-87; 73089: V-28; 73100: VI-1; 73216: V-85; 73370: V-66; 73795: V-28; 73856: VI-1; Hu 460: V-87; Hume 7251a: V-69.

Idenburg 45: V-34; Igon 456: V-69.

Jack, Herb. Wallich 1040.1: V-69; 1041.1: V-77; Jaheri 174: VI-5; 447: VI-5; 873: V-69; 1092: V-69; Johnson s.n.: V-1b, 8; Juany s.n.: V-3; Junghuhn s.n.: V-33, 65, 69.

Kajewski 1039: V-8; 1219: V-1a; 1290: II, II-9; Kanehira 262: V-87; 3105: V-61; 3982: V-53; Kanjilal 2382: V-79; Kawakami 263: V-61; Kelsall s.n.: V-65; Kerr 622: V-79; 693: V-69; 5037: V-61a; 5195: V-79; 5304: V-79; 5335: V-61a; 5781: VI-1; 6060: V-61a; 10408: VI-1; 16231: V-34; 16852: VI-1; 16860: V-65; 16860a: V-65; 17051: VI-1; 17911: V-34; 18491: V-77a; 20058 V-79; 20251: V-61a; Khant 66: V-34; Kiah SF 32065: V-17; 32327: V-17; 35088: V-34; King 2101: V-79; Kjellberg 744: V-19; 2419: I; Klemme FB 869: V-65; Kloss s.n.: V-60, 79; 6719: V-34; 6815: VI-1; 6928: V-69; SF 18979: V-34; Kobus s.n.: V-65, 69; Konishi s.n.: V-66; Koorders 2103: V-33; 3358: V-65; 4528: VI-6; 6233: V-33; 6234: V-33; 6235: VI-6; 6237: V-33; 6238-42: V-33; 6244: VI-6; 6245/47: V-65; 6248: V-65; 6249: V-69; 6250: V-33; 6251: V-69; 6252: V-33;; 6253: V-33; 6255: V-33; 6256: V-69; 6257: V-69; 6260: VI-7; 6261: V-33; 6262: V-69; 6263: V-33; 6264: V-33; 6265: V-69; 6266: V-69; 6267: V-65; 6268: V-33; 6269: V-33; 6270: V-65; 6271: V-69; 6272: V-69; 6273: V-65; 6274: V-69; 6275: V-69; 6276: V-69; 6277: VI-7; 7659: V-33; 8061: V-33a; 10054: VI-6; 10456: VI-7; 10987: V-65; 11038: VI-6; 11236: V-69; 11337: V-33; 11338: V-69; 11819: VI-7; 11820: V-33; 12095: V-33; 12155: VI-6; 12198: V-69; 12200: VI-7; 12596: V-33; 12616: V-33; 13007: V-33; 13831: V-69; 13837: V-65; 13878: V-69; 13901: V-69; 13953: V-69; 13973: V-33; 15011: V-65; 15265: V-65; 15311: V-33; 17516: V-14; 18513: V-14; 18529: V-14; 19582: V-14; 20841: V-33; 20939: VI-6; 21727: V-33; 21737: V-33; 21738: V-33; 21895: VI-7; 22216: V-33; 24313: V-65; 24314: V-33; 24358: V-69; 24364: V-33; 25547: VI-6; 25600: V-33; 25715: V-33; 25765: V-65; 25924: V-33; 26436: V-65; 26537: V-33; 26556: V-33; 26619: V-69; 26827: V-65; 27100: VI-7; 27101: VI-7; 27144: VI-7; 27901: V-69; 27902: V-69; 29353: V-33; 29354: V-33; 29355: V-69; 30443: V-65; 30444: V-65; 31938: V-65; 32177: V-33; 32187: V-33; 32731: V-33; 32817: V-33; 33251: V-33; 33789: V-65; 33859: V-69; 33951: VI-7; 36632: V-69; 36649: VI-7; 37375: V-33; 37908: V-69; 37942: VI-7; 37949: VI-7; 38693: V-69; 38962: V-69; 39065: V-65; 39066-69: VI-7; 39070: V-69; 39071: V-65; 39072-76: VI-7; 39162: V-65; 39163: VI-7; 39173: VI-7; 39230: V-69; 39554: VI-6; 39660: V-33; 40109: V-69; 40622: V-69; 41765: V-33; 41824: V-33; Korthals s.n.: V-33, 65, 69; Koster Bw. 1110: V-51;

Kostermans 4364; VI-2; 7597: V-33; Kunstler s.n.: V-34; 32: V-34; 82: V-34; 221: V-34; 245: V-34; 267: V-34; 269: V-34; 400: V-34; 479: V-34; 612: V-34; 691: V-34; 764: V-69; 3383: V-69; 3392: V-34; 3714: V-77a; 3881: V-77a; 4213: V-17; 4301: V-69; 4594: V-69; 4641: V-77; 4939: V-17; 5096: V-17; 5438: V-77; 5928: V-34; 5931: V-69; 6096: V-34; 6100: V-34; 6217: V-77a; 7316: VI-2; 8496: V-69; 8504: V-17; 8687: V-77; 8795: V-69; 10836: V-34; Kuntze 5171: V-65; Kurz s.n.: V-79; VI-1; 197: V-79; 331: V-79; 987: V-79; 987bis: V-73; 3123: V-73.

Labohm 1208: V-65; 1959: V-65; Lacaita s.n.: V-79; Lace s.n.: VI-1; 3150: V-79; 4800: VI-1; 5656: V-73; 5799: VI-1; 5800: V-79; Ladbrook 51: V-2; Lam 2271: V-65; 3297: V-52; 3771: V-52; Langlassé 196: V-34; Lau 913 V-87b; 948: V-87b; 1453: V-87; 1640: V-87; 2264: V-87; 2558: V-87; 2600: V-87a; 3995: V-87; 4112: V-87b; 4436: V-87; 5000: V-61a; 20279; V-87a; 27163: V-61; 28252: V-28; Leaño FB 22907: V-65; Ledermann 7594: V-75; 8412: III; 8834: V-25; 9128: V-31; 9605: V-68; 10184: V-81; 10954: V-46; 11211: V-46; 11474: V-46; 11882: V-26; 12491: V-25; Leefmans s.n.: V-65; Lei 106: V-66; 254: V-87; 713: V-87; Leschenault s.n.: V-69; Levine, see Canton Chr. Coll.; Liang 62538: VI-1; 62795: V-66; 65834: VI-4; 67430: V-66; 69656: V-61; 69841: V-28; Lingnan Univ. Herb. 12690: V-87b; Lister s.n.: V-79; Liu 1292: V-87; Loher 4499: V-65; 4500: V-65; 5070: V-65; 6723: V-65; 6726: V-65; 6733: V-65; 6740: V-65; 6747: V-13; BS 12208: V-65; 12371 V-13; 13738: V-65; 14988: V-65; Longmon s.n.: V-5; Loogen s.n.: V-69; Lopez BS 42042: V-65; Lörzing 608: V-69; 836: V-69; 1199: V-65; 4190: V-65; 4204: V-65; 4606: V-34; 5647: V-65; 5685: V-69; 7946: V-65; 9692: V-69; Loureiro s.n.: V-87; Low s.n.: V-1a; L.U. 17806: V-66; 18185: V-66; Lucas s.n.: V-8.

Mabesa FB 28048: V-65; Mackenzie 9: V-79; McAdam 229: V-7; McClure 7817: VI-1; 7909: VI-1; 8069: V-66; 8385: V-66; 8390: VI-1; 8429: V-66; 9206: V-66; 9563: V-66; 9640: VI-1; 9716: V-66; 13759: V-87; 20105: VI-1; McGregor s.n.: V-36, 65, 71; 722bis: V-79; BS 18552: V-65; 19829: V-65; Maiden s.n.: V-1; 103: II-8; Maingay 1261: V-34; 1309 (1792): V-65; Kew Distr. 1310 (3138): V-34; 1311 (1791): V-65; Mair NGF 1866: V-51; 1895: V-51; Maire s.n.: V-87; Manson 31: V-34; Martin s.n.: V-4; 26: V-4; Masamune s.n.: V-87; Maximovicz s.n.: V-87; Mayr 757: V-45; Mearns & Hutchinson FB 4549: V-15; 4700: V-65; Meebold 5884: V-79; 8033: V-79; 9261: V-79; 16703: V-73; Mell 746: V-87b; 949: V-87b; Mendoza PNH 20382: V-65; Merrill 1849: V-65; 2635: V-65; 3767: V-65a; 10358: V-87a; 11001: V-87; Merritt BS 8723: V-65; Meijer 2484: V-77; 2541: V-77; Meyer FB 2599: V-65; 2602: V-65; Michael s.n.: V-8; 243: V-2; de Monchy 65: V-65; 138: V-65; Moore s.n.: II-8, V-5, 5a, 9; 4: V-1; 115: V-9; 235: V-9; Motley 393: V-77a; Moysey & Kiah SF 33362: V-43; Mueller s.n.: V-1, 3.

NGF 1284: V-64; NIFS bb. 2438: V-65; 6608: V-33; 7917: V-34; 8622: V-65; 8917: V-19; 11097: V-69;11929: VI-2; 14263: V-52; 15623: V-34; 19710: I; 20047: V-19a; 20428: V-47; 23755: V-52; 23761: V-52; 25169: V-52; 28336: V-16; Noerkas 438: V-69; N. Queensl. Herb. Cairns 14253: V-4; Nur s.n.: V-69; SF 7416: V-65; 11173: V-77a; 20001: V-69; 21752: V-69; 32562: V-17; 32617 V-69.

Ocampo BS 27918: V-65; 27954: V-65; Oldham s.n.: V-87.

Packman s.n.: V-34; Pancher s.n.: II-7; Pancher & Vieillard 421: II-6; Parish 1023: V-79; Parkinson 7: V-79; 252: V-79; 662: V-79; 818: V-34; 2076: V-79; Parry 104: VI-1; 519: VI-1; 602: VI-1; 687: VI-1; 804: VI-1; Peckel s.n.: V-7; 242: V-53; 1209: V-7; 1249: V-54; Pételot 950 V-87; 1061: V-87; 1626: V-79; 2619: V-66; 2628: V-66; 3888: V-61; 4791: V-74; 5684: V-84; 5721: V-74; 5839: V-87; 6184: V-87; 8923: V-87; Pierot 601: V-87; Pierre 692 p.p.: V-79; 1441: V-34; 2855: V-34; Podenzana s.n.: II-1; Poilane 321: V-38; 449: V-87; 1428: V-87; 3926: V-79; 5249: VI-1; 6923: V-28; 7086: V-28; 7116: V-79; 7526: V-87; 7903: V-87; 10555: V-28; 11032: V-28; 12895: V-79; 18031: V-28a; 21891: V-87; 21915: V-87; 21975: V-87; 22204: V-87; 22562: V-79; 23166: V-38; 25694: V-42; 26395: V-61a; 30050: V-87; Popta 26: V-65; Prain 42: V-79; Prain's coll. 385: V-65; 812: V-65; Price 446: V-61; 536: V-87; 542: V-61; 913: V-61; 1121: V-61; Pulle 3199: V-65; Put 3482: V-61a; 3782: V-79; 3786: V-79; 3911: V-79; 3928: V-61a.

Quisumbing BS 82301: V-65; Quisumbing & Sulit BS 82385: V-65.

Rahmah 7543: V-33; 7655: V-33; 7694: V-33; 7812: V-33; 8056: V-33; Rahmat Si Bocea 6445: V-69; 6610: V-69; 6828: V-69; 7437: V-69; 7562: V-69; 7637: V-69; 8134: V-69; 9289: V-33; 9516: V-69; 9798: V-34; Ramos 1653: V-34; 10912: V-65;

BS 305: V-65; 1128: V-13; 5705: V-65; 5806: V-65; 8203: V-13; 15127: V-65a; 20463: V-65; 23320: V-65; 23632: V-65; 23660: V-13; 24408 V-65; 30202: V-13; 30525: V-65; 39591: V-15; 40952: V-65; 41024: V-65a; 41115: V-65; 41117: V-65; 41485: V-13; 77089: V-13; Ramos & Convocar BS 83867: V-80; 83941: V-65a; 84098: V-80; Ramos & Edaño BS 26532: V-65; 29176: V-65; 29351: V-65a; 37448: VI-5; 37688: V-65; 37998: V-65; 38715: V-15; 38879: V-13; 38938: V-65a; 38969: V-13; 38994: V-65a; 39116: V-65; 40659: V-65; 45487: V-65; 47003: V-65; 49382: V-65; 75239: V-13; 75253: V-13; 75332: V-65; Ramos & Pascasio: BS 34610: V-80; 34621: V-80; Reinwardt s.n.: V-65; R. For. Dep. Thailand 2843: V-79; 3686: V-27; 3838: V-79; 4539: V-79; 4850: VI-1; 5635: V-79; Ridley s.n.: V-33, 69; 3625a: V-77; 3625b: V-77; 4695: V-77; 4696: V-77; 6257: V-77; 6428: V-34; 12683: V-69; 13008: V-69; 13224: V-69; 15105: V-34; 15537: V-34; 15441: V-65; 16126: V-69; Riedel s.n. V-65; Robertson s.n.: VI-1; 360: V-79; Robinson 1657: V-52; Pl. Rumph. amb. V-52; Robinson & Kloss s.n.: V-65; 6118: V-77; Rock 2196: V-79; 2200: V-79; Rodger 104: V-79; 163: V-79; 166: V-79; 333: V-79; Rothwell s.n.: V-1; Roxburgh s.n.: V-34, 65; Rutten 93: V-69.

Sakurai s.n.: V-87; Santos BS 31713: V-65; FB 24136: V-65a; Sarip 255: V-69; 470: V-69; Sayer s.n.: V-1b; 110: V-8; Scheffer s.n.: V-65; Schiffner 1912: V-65; Schlechter 14351: V-22; 14511: V-23; 17119: V-62; 17640: V-62; 18162: V-68; 18547: V-45; 18715: V-37; 19432: V-55; Schlencker s.n.: V-64; Schneider s.n.: V-1; Schultz 559: V-3; Scortechini 195: V-69; 467b: V-33; 687: V-34; 774: V-17; Shaik Mokim s.n.: V-79; Shirley s.n.: V-1, 5; De Silva (Wallich 2702): V-65; Simmonds s.n.: V-1a; Sinclair SF 40049: V-34; 40294: V-69; Sjoevall s.n.: V-65; Slater s.n.: V-1; van Slooten 722: V-65; Chr. Smith s.n.: V-33, 52; L. S. Smith NGF 1284: V-51; Smith & Rant 600: V-65; Soo 68175: V-66; Spanoghe s.n.: V-65; van Steenis 2529: V-69; 4125: V-33a; 5043: V-65; 5611: V-33; 6777: V-33a; 6801: V-33a; 7439: V-65; 8441: V-65; 10718: V-69; 11668: V-33a; 12723: V-65; 17931: V-65a; Steward & Cheo 680: V-87a; 1002: V-87a; Sulit PNH 2643: V-13; 6461: V-65; 9953: V-65; 21668: V-65; Suzuki 3217: V-61; Sykes & Gamble 2304: V-79.

Tachiro s.n.: V-87; Tennison Woods & Holtze 233: V-3; Teysmann s.n.: V-34, 65; 11388: V-33; 11530: V-34; 14117: V-47; HB 1877: V-52; 3476: V-65; 3934: V-69; Thorel 2793: V-34; Thorenaar P 86: V-34; Thwaites CP 690: V-56; Tomlinson s.n.: V-1; Toppin 6226: V-79; Toroes 3965: V-69; 4691: V-69; 4746: V-69; 5092: V-69; 5294: V-69; Treacher s.n.: V-77; Tsai 51914: V-42; 52441: V-42; 53359: V-79; 55092: V-42; 55124: V-87; 55309: V-42; 56374: V-79; 56915: V-79; 60275: V-87; 62264: V-42; 62777: V-87; Tsang 409: V-87; 439: V-87; 590: V-66; 846: VI-4; 887: V-66; 20999: V-87; 21378: V-87b; 22236: V-87; 22324: VI-1; 22430: V-28a; 22624: V-87; 23257: V-87; 23336: V-87; 23977: V-87; 24030: V-87; 24254: V-87a; 24355: V-87; 24569: V-87; 26880: V-61; 26961: VI-1; 27078: VI-1; 27252: VI-1; 28974: V-61; 29174: V-61; 29299: VI-1; 30083: V-28a; Tsang & Fung s.n.: V-66; Tsiang 1614: V-87; 2548: V-87; 2932: V-87; 2948: V-87; 6264: V-87a; 6630: V-87a; 7041: V-87a; 10181: V-87; 10485: V-87; 12883: VI-1; Tso 20285: V-87a; 20985: V-87a; 21051: V-87a; Tsoong 1897: V-66; Tsui 747: V-87b.

Uno s.n.: V-87.

Valentin FB 29781: V-65a; Vanpruk 815: V-34; Versteeg 1471: V-24; Versteegh Bw. 3102: V-46; Vidal 535: V-65; 1141: V-65a; 1692: V-65; 2008: V-65; 2136a: V-65; 3619: V-65; 3620: V-65; Vieillard 1107: II-6; 1108: II-6; 2153: II-5; de Voogd 177: V-69; de Vriese & Teysmann s.n.: V-52.

Wallich 1038: V-34; 1041.2: V-77; 3661: V-65; Wang 509: V-87a; 34549: V-66; 35208: V-66; 35344: V-87; 35905: V-85; 36056: V-85; 36148: V-66; 36321: VI-4; 39624: V-28a; Warburg 2832: V-65; 5801: V-87; Ward 8829: V-79; 12752: V-79; 13517: V-79; Waterhouse 349: V-7; Watt 7160: V-79; R. E. P. 11574: V-79; Wenzel 629: V-65; 1020: V-65; 2958: V-65; White s.n.: V-1, 1b, 5, 5a; 626: V-51; 801, V-25; 1290: V-8; 3278: V-1; 7490: V-1; 10643: V-4; 10643a: V-6; Whitford 118: V-65; 171: V-13; 342: V-65; 460: V-13; 982: V-65a; Wilford 517: V-61; Williams 426: V-65; 617: V-65; 718: V-65; 1342: V-65; Wilson 9789: V-61; 10318: V-87; 10889: V-61; 11233: V-87; Winckel 777: V-65; 778: V-65; Winkler 2195: V-65; Womersley 5319: V-41; NGF 4368: V-70; 4386: V-21; 4423: V-49; Womersley & Hoogland NGF 4952: V-49; 4962: V-49; Wray 983: V-77a; 1160: V-77a; 2083: V-17; 2159: V-69; 2310: V-34; 2671: V-69; 3084: V-17; 3144: V-69; 3156: V-69; 4052: V-69; Wright 459: V-87; Wyatt-Smith KEP 71158: V-34.

Yates 1191: V-69; 1593: V-69; 2510: V-69; Yü 16089: V-79.
Zippelius s.n.: V-33, 52; Zollinger 597 (= 2599): V-69; 1482: V-33; 1594: V-69; 3023 p.p.: V-65, 69.

Index to scientific names

New taxa and combinations are printed in **bold face** type; synonyms are in *italics*.

Adenostephanus bleasdalei (F. v. M.) Benth. III
Alseodaphne crassipes Hook. f. V: 34
Artocarpus chaphasha ? Roxb. ex Koord.-Schum. VI: 7
Bleasdalea F. v. M. III
— *cupanioides* F. v. M. III
— *papuana* (Diels) Domin III
Brabeium stellatifolium L. II, V
Castronia Noronha V
Cyanocarpus F. M. Bail. V
— *cribbiana* Bail. V: 2
— *nortoniana* Bail. V: 8
Darlingia spectatissima F. v. M. V
Euplassa bleasdalei (F. v. M.) Diels III
— *papuana* Diels III
Finschia chloroxantha Diels V
— *erratica* Hook. f. ex Boerl. V: 79
— *excelsa* (Roxb.) Bl. ex Boerl. V: 14
— *sumatrana* Miq. ex Boerl. V: 69
Gevuina avellana Mol. III
— **bleasdalei** (F. v. M.) Sleum. III
— **papuana** (Diels) Sleum. III
Grevillea bleasdalei F. v. M. III
— **elbertii** Sleum. I
Helicia Lour. IV, V, VI
— acutifolia Sleum. V: 48
— affinis Sleum. V: 62
— arguta Sleum. V: 32
— albiflora Sleum. V: 76
— *amboinensis* Miq. V: 52
— amplifolia Sleum. V: 11
— *annularis* W. W. Smith V: 87
— **archboldiana** Sleum. V: 59
— *artocarpoides* Elm. V, VI: 5
— attenuata (Jack) Bl. V: 69
— *attenuata* [non (Jack) Bl.] Kurz V: 65
— *attenuata* [non (Jack) Bl.] Ridl. V: 77
— *australasica* (non F. v. M.) Bail. V: 4
— australasica F. v. M. V: 3
— *balansae* Lec. V ,VI: 1
— *bauerlenii* White V: 9
— *bennettiana* Miq. V: 69
— biformis Sleum. V: 83
— *brachyantha* Merr. V: 33
— *brassii* V: 20
— *brevïpetiolata* Merr. V: 66
— **bullata** Sleum. V: 70
— cameronii F. v. M. V: 36
— carrii Sleum. V: 20
— *castaneaefolia* Meisn. V: 65
— *cauliflora* Merr. V: 84

Helicia **celebica** Sleum. V: 14
— ceylanica Gardn. V: 56
— clemensiae Sleum. V: 63
— clivicola W. W. Smith V: 78
— cochinchinensis Lour. V, V: 65, 87
— — var. **lungtauensis** Sleum. V: 87b
— — var. **pseuderratica** Sleum. V: 87a
— *cochinchinensis* (non Lour.) Meisn. V: 79
— commutata Sleum. V: 45
— *conjunctiflora* F. v. M. V: 5a
— cribbiana (Bail.) Bail. V: 2
— *cumingiana* Presl V: 65
— — *var. parvifolia* Merr. V: 65
— *curtisii* Gamble V: 33
— *darlingiana* F. v. M. V
— dentellata Sleum. V: 30
— *divaricata* Sleum. V: 20
— *diversifolia* White IV, V
— **elephanti** Sleum. V: 38
— *erratica* Hook. f. V: 79
— — *var. lungtauensis* F. P. Metcalf V: 87b
— *erratica* (non Hook. f.) Stapf V: 39
— *erratica* (non Hook. f.) Suesseng. V: 65a, 77
— excelsa (Roxb.) Bl. V: 34
— — var. V: 14
— — *var. celebica* Koord. V: 14
— — *var. edentata* Meisn. V: 34
— — *var. forbesii* Gamble V: 34
— — *var. salicifolia* (Presl) Gamble V: 34
— ferruginea F. v. M. V: 9
— — var. V: 8
— — *var. tropica* Bail. V: 8
— ferruginea F. v. M. ap. Benth. V: 8
— finis-terrae Lauterb. V: 68
— forbesiana F. v. M. V: 64
— formosana Hemsl. V: 61
— — var. formosana V: 61
— — var. **oblanceolata** Sleum. V: 61a
— fuscotomentosa Suesseng. V: 16
— *glabrata* Meisn. V: 65
— glabrescens White V: 4
— glabrifolia F. v. M. V: 5
— — var. conjunctiflora (F. v. M.) Domin V: 5a
— graciliflora Merr. V: 82
— *grandifolia* Lauterb. V: 24
— grandifolia Lec. V: 67
— grandis Hemsl. V: 42
— hainanensis Hayata V: 66
— *henryi* Diels V, VI: 1
— heyana Bail. II, II: 9, V
— *hookeriana* Hosseus V: 79
— hypoglauca Diels V: 75
— *incisa* K. & V. V, VI: 7
— insculpta Sleum. V: 70
— *integra* Merr. V: 65a
— *integrifolia* Elm. V: 65a
— *javanica* (Bl.) Bl. V: 65
— *kingiana* (non Prain) Merr. V: 69
— *kingiana* Prain V: 77a
— **kjellbergii** Sleum. V: 19
— — var. **calva** Sleum. V: 19a

Helicia lamingtoniana (Bail.) White ex L. S. Smith V: 6
— *lanceolata* (non K. & V.) Bak. f. V: 69
— *lanceolata* K. & V. V, VI: 6
— *lancifolia* S. & Z. V: 87
— latifolia White V: 51
— lauterbachiana Sleum. V: 24
— ledermannii Diels V: 31
— *lobata* Merr. V, VI: 4
— *longiflora* Merr. V: 65a
— longipetiolata Merr. & Chun V: 85
— *loranthoides* (non Presl) Merr. V: 15
— loranthoides Presl V: 13
— longespicata Sleum. V: 18
— *macrophylla* Wall. V: 65
— macrostachya Lauterb. V: 55
— maxwelliana Gibbs V: 43
— **microcarpa** Sleum. V: 41
— *micronesica* Kaneh. V
— microneura White V: 29
— microphylla Diels V: 37
— moluccana (R. Br.) Bl. V: 52, 53
— *moluccana* [non R. Br.) Bl.] Lauterb. V: 62
— neglecta Diels ex Sleum. V: 54
— nilagirica Bedd. V: 79
— nortoniana (Bail.) Bail. V: 8
— *oblanceolata* Merr. V: 34
— *oblongifolia* Benn. V: 69
— — *var. subpetiolata* Miq. V: 69
— *obovata* Benn. V: 69
— — *var. connata* K. & V. V: 69
— — *var. minor* Meisn. V: 69
— *obovata* (non Benn.) Kurz V: 65
— *obovata* (non Benn.) Ridl. V: 65
— obovatifolia Merr. & Chun V: 28
— — var. **mixta** (Li) Sleum. V: 28a
— *obscurinervis* Chatterjee V: 77a
— obtusata Sleum. V: 58
— *obtusidens* Miq. V: 52
— odorata Diels V: 46
— *oligophlebia* Merr. V: 65
— olivacea Sleum. V: 44
— oreadum Diels V: 25
— ovata (Jack) Benn. V
— pallescens Diels V: 81
— *pallidiflora* W. W. Smith V, VI: 1
— *parasitica* Pers. V
— paucinervia Merr. V: 80
— peekelii Lauterb. V: 53
— peltata White V: 35
— petelotii Merr. V: 74
— petiolaris Benn. V: 52, 77
— — var. **kingiana** (Prain) Sleum. V: 77a
— *phaeotricha* Diels V: 25
— *philippinensis* Meisn. V: 65
— platyphylla Sleum. V: 12
— *praealta* F. v. M. II: 8, V
— **pterygota** Sleum. V: 39
— **purpurascens** Sleum. V: 21
— pyrrhobotrya Kurz V: 73
— retevenia Sleum. V: 57
— **rigidiflora** Sleum. V: 15

Helicia robusta (Roxb.) R. Br. ex Wall. V: 65
— — var. integrifolia (Elm.) Sleum. V: 65a
— *robusta* [non (Roxb.) R. Br. ex Wall.] Hosseus V: 79
— rufescens Prain V: 17
— *salicifolia* Presl V: 34
— saruwagedica Sleum . V: 49, 51
— **saurauioides** Sleum. V: 50
— *sayeriana* F. v. M. V
— schlechteri Lauterb . V: 23
— *scortechinii* Gamble V: 33
— *scottiana* F. v. M. V
— sellae-montis Sleum. V: 10
— serrata (R. Br.) Bl. V, V: 33
— — var. **oreophila** Sleum. V: 33a
— — *var. petiolata* K. & V. V: 33
— — var. serrata V: 33
— — *var. subintegra* K. & V. V: 33
— shweliensis W. W. Smith V: 40
— silvicola W W.. Smith V: 72
— stelechanta Diels V: 26
— stenophylla Merr. V: 86
— *stricta* Diels V: 79
— *subrhombifolia* Domin V: 5
— *suffruticosa* Ridl. V: 69
— *sumatrana* Miq. V: 69
— *terminalis* Kurz V, VI: 1
— *ternifolia* (F. v. M.) F. v. M. V
— **teysmanniana** Sleum. V: 47
— *tonkinensis* Lec. V: 87
— torricellensis Lauterb. V: 22
— *travancorica* Bedd. ex Hook. f. V: 65
— *tropica* (Bail.) Domin V: 8
— *tsangii* Li V: 61
— uganensis Diels ex Sleum. V: 7
— *validinervis* White V: 25
— *velutina* Prain V, VI: 2
— *verticillata* F. v. M. II, V
— *vestita* (non W. W. Smith) Li V: 28a
— vestita W. W. Smith V: 27
— — *var. mixta* Li V: 28, 28a
— *whelani* Bail. II: 1, V
— wollastonii Ridl. V: 60
— youngiana Moore & F. v. M. V: 1
— — var. montana White V: 1b
— — var. robusta White V: 1a
— — var. typica White V: 1
— — var. youngiana V: 1
— zeylanica V: 56
Heliciopsis Sleum. V, VI
— **artocarpoides** (Elm.) Sleum. VI: 5
— **incisa** (K. & V.) Sleum. VI: 7
— **lanceolata** (K. & V.) Sleum. VI: 6
— **lobata** (Merr.) Sleum. VI: 4
— **rufidula** Sleum. VI: 3
— **terminalis** (Kurz) Sleum. VI: 1
— **velutina** (Prain) Sleum. VI, VI: 2
Helittophyllum Bl. V
— *javanicum* Bl. V: 65
Hicksbeachia F. v. M. IV, V
— **diversifolia** (White) Sleum. IV
— pinnatifolia F. v. M. IV

Hollandaea lamingtoniana Bail. V: 6
— sayeri F. v. M. V
Kermadecia Brongn. & Gris III
— austro-caledonica (Brongn. & Gris) Benth. & Hook. f. III
— *bleasdalei* (F. v. M.) Benth. & Hook. f. ex Bailey III
— pronyensis (Guillaum.) Guillaum. III
Lomatia III
Loranthus pentapetalus Roxb. V
Macadamia F. v. M. II, V, VI
— **francii** (Guillaum.) Sleum. II: 7
— **heyana** (Bail.) Sleum. II: 9
— hildebrandii Steen . II: 2
— lowii Bail. II: 3
— minor Bail. II: 3
— praealta (F. v. M.) Bail. II: 8, V
— **rousselii** (Vieill.) Sleum. II: 5
— ternifolia F. v. M. II: 3, V
— tetraphylla Johns. II: 4
— *verticillata* (F. v. M.) F. v. M. ex Benth. III
— **vieillardii** (Brongn. & Gris) Sleum. II: 6
— whelani (Bail.) Bail. II: 1, V
— *youngiana* (Moore & F. v. M.) F. v. M. V: 1
Oreocallis III
Orites III
"Rhopala" = Roupala
Roupala II, III, V
— *attenuata* Jack V: 69
— *bleasdalei* (F. v. M.) F. v. M. III
— *cochinchinensis* (Lour.) R. Br. V: 87
— *excelsa* Roxb. V: 34
— *francii* Guillaum. II, II: 7
— *glabrata* Wall. V: 65
— *moluccana* R. Br. V: 52
— *moluccana* (non R. Br., non Roxb.) Jack V: 77
— *moluccana* (nec R. Br., nec Jack) Roxb. V: 69
— *ovata* Jack V
— *robusta* Roxb. V: 65
— *robusta* (non Roxb.) Spreng. V: 87
— *rousselii* Vieill. II, II: 5
— *serrata* R. Br. V, V: 33
— *serrata* Roxb. V
— *vieillardii* Brongn. Gris II: 6
— — *var. longifolia* Brongn. & Gris II: 6
Rupala serrata Reinw. V: 65
Xylomelum salicinum A. Cunn. V

FLORAE MALESIANAE PRECURSORES IX
NEW MALAYSIAN SPECIES OF FIMBRISTYLIS

by

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INTRODUCTION. — During the last World War Dr Ohwi worked for several years in the Herbarium Bogoriense and compiled a preliminary revision of the Malaysian representatives of the genus *Fimbristylis*. The absence of any world revision, the temporary inaccessibility of type material, and of adequate literature, were the causes that this revision had an entirely preliminary shape and made it inadvisable to publish the MS as it was, due to circumstances alluded to above.

Fortunately Mr J. H. Kern, who is in charge of the colossal job of organizing the revision of Cyperaceae for the *Flora Malesiana*, has undertaken the delicate, time-consuming task of carefully checking the novelties distinguished by Dr Ohwi, which are to be incorporated in his own revision of the genus. Some species distinguished by Dr Ohwi have appeared to be conspecific with already described species from other parts of the palaeotropics, others have since 1941 been described by contemporaneous workers on the genus. The following species have hitherto stood the test and are at present accepted by Mr Kern and Dr Ohwi as good new species. Permission for publication was readily granted both by the Keeper of the *Herbarium Bogoriense* and by Dr Ohwi. I am exceedingly grateful both to them and to Mr Kern for their mutual trust and co-operation and their generous attitude.

C. G. G. J. VAN STEENIS.

1. **Fimbristylis malayana** Ohwi, sp. nov. — Sect. *Fuscae* — Fig. 1.

Glabra; rhizoma abbreviatum, caespitosum, pluriculme. *Folia* culmo 2—3-plo breviora, falcata, plana, 10—20 cm longa, 1.5—2 mm lata, apice rotundata apiculata, margine incrassato sursum scabra, supra celluloso-striolata, subtus 5—7-sulcata, intus basi sensim in vaginam transeuntia eligulata; vaginae subcoriaceae, brunneae vel fuscae, vix nitidae, ecarinatae, striatae, antice membranaceo-stramineae fissae. *Culmi* stricti, obtuse 3—4-angulati, laeves, leviter vel vix compressi, 20—30 cm alti, inferne vaginis 1—2 aphyllis vel brachyphyllis 1—2 cm longis vix vel breviter tubulosis cincti. *Anthela* simplex vel subcomposita, angusta, densiuscula, pluri—pauci-spiculosa, 3—4 cm longa, bracteis omnibus squamiformibus glabris et laevibus margine albo-dilatatis, radiis 2—4 inaequalibus suberectis firmulis sub-

compressis laevibus obtusangulis 2—3 cm longis raro 2-radiolatis. *Spiculae* lanceolatae vel lineari-lanceolatae, saepe tortae, acutae, compressae, pauci—plurisquamae, 6—10 mm longae, 1.7—2 mm latae. *Squamae* inferiores 2 paullo breviores, vacuae, superiores paucae steriles, reliquae fertiles, ovatae vel anguste ovatae, subdense distiche imbricatae, acuminatae, rectae, suberectae, chartaceae, non vel vix nitidae, 4 mm longae, sordide brunneae, superne minutissime puberulae, dorso acute carinatae, carina concolore, lateribus enerves, margine latiuscule albidae. *Stamina* 3; antherae lineares, 1.2 mm longae. *Achenia* compressiuscule trigona, late obovata, $^{2}/_{3}$ mm longa, albida demum brunnescentia, leviter nitida, costis acutiusculis, facie planiuscula, laeviuscula vel ex toto cellulis extimis minutis rotundatis punctulata, apice late rotundata; stylus gracilis, glaber, basi elongato-conicus, 3 mm longus, stigmatibus 3 capillaribus laeviusculis. — Affinis videtur *F. tortispica* Turrill, a qua ex descr. differt omnibus partibus humilioribus, foliis brevioribus, spiculis paucioribus, squamis vix late ovatis apice haud mucronatis, achenio minore.

Malay Peninsula. Pulau Langkawi, Selat Panchor, on limestone in open places, Nov. 22, 1934: *Henderson SF 29052* (*type*, BO).

2. Fimbristylis anisoclada Ohwi, sp. nov. — Sect. *Miliaceae* — *Fig. 2.*

Culmi elatiusculi, validiusculi, irregulariter acute 5-quetri quasi alati, vix compressi, ad angulos superne scabriusculi. *Anthela* supradecomposita, interrupta denseque permultispiculosa, 12—20 cm longa 5—10 cm lata, bracteis 4—6 setaceis, inferioribus 1—2 linearibus 6—8 cm longis, strictis, erectis, 1—

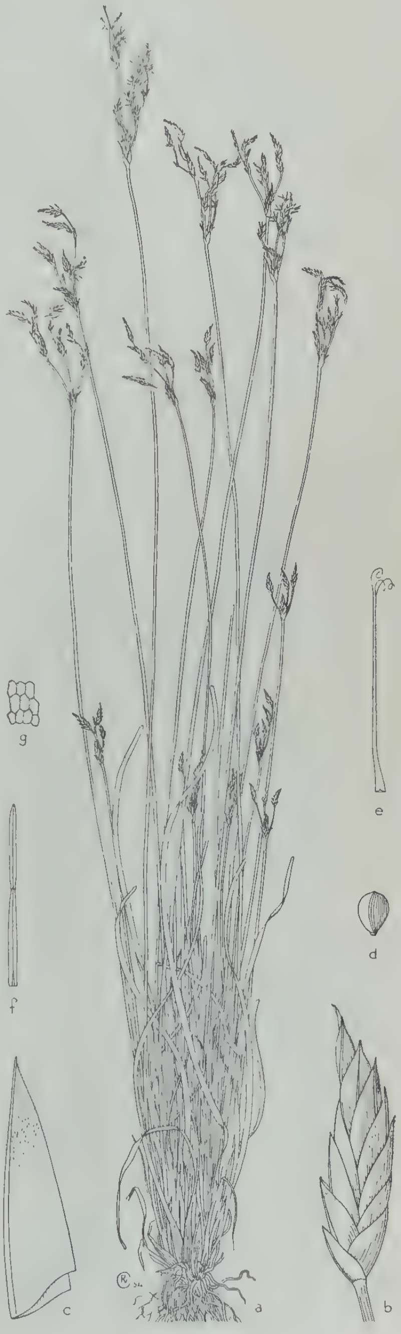

Fig. 1. *Fimbristylis malayana* Ohwi — a. Habit, × ½; b. spikelet, × 5; c. glume, × 10; d. achene, × 10; e. style and stigmas, × 10; f. stamen, × 10; g. outer cells of achene — From *Henderson SF 29052* (BO).

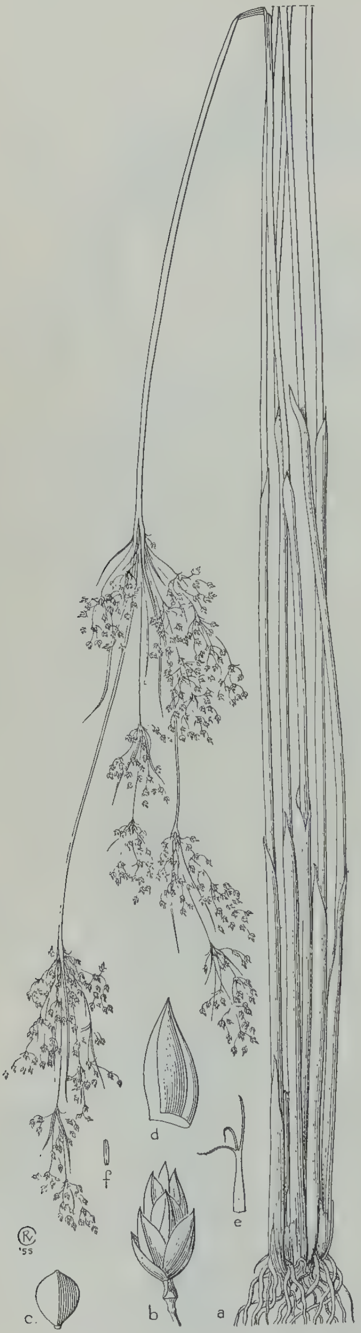

Fig. 2

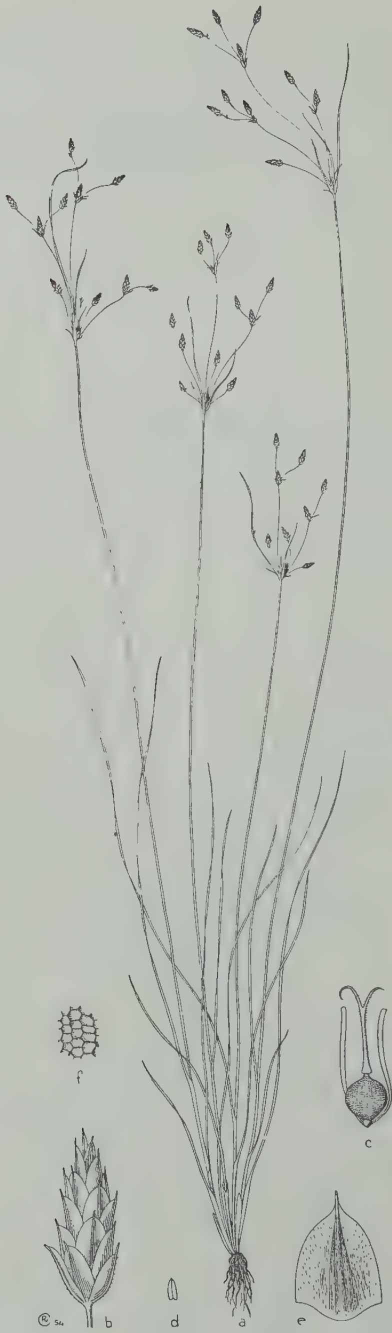

Fig. 3

1.5 mm latis rigidulis, sursum sensim angustatis, acuminatis, subtus pauci-striatis subcostatis laeviusculis, supra estriatis, ex toto scabro-exasperatis, margine incrassato sursum scabriusculis, radiis valde inaequalibus, strictis, numerosis, acute 4—5-angulatis, vix compressis, laeviusculis, usque ad 12 cm longis, radiolis ad 5 cm longis, anthelulis 3—4-ve compositis, usque ad 8 cm longis, bracteolis setaceis usque ad 5 cm longis. *Spiculae* solitariae, ovatae, acutiusculae, subangulatae, laxiuscule pauci- vel pluriflorae, castaneo-fuscae, 2—3 mm longae, 1—1.5 mm latae. *Squamae* ovatae vel late ovatae, 1.2—1.3 mm longae, ascendentes, acutiusculae, mucronatae, laeves, glabrae, nitidulae, obscure 3-nerves, dorso obtuse lateque carinato atro-castaneo nitido, lateribus dilute castaneae enerves, margine membranaceo scariosae. *Stamina* 1 vel 2; antherae lineares, $^1/_3$—$^2/_5$ mm longae, apice cuspidatae. *Achenia* angulo acutiusculo trigona, paullulo compressa, facie convexiuscula, pallida, nitidula, 0.6 mm longa, late vel suborbiculato-obovata, laevia, cellulis extimis transverse ellipticis vel rotundatis obsoletissimis obsoletissime punctulata; stylus trigonus, glaber, basi elongato-pyramidatus, $^2/_3$ mm longus, stigmatibus 3 pertenuibus papillosis $^1/_3$ mm longis.

South Celebes. Mara, May 13, 1912: *Noerkas (exp. Van Vuuren) 218* (*type*, BO).

3. **Fimbristylis capilliculmis** Ohwi, sp. nov. — Sect. *Autumnales* — *Fig. 4.*

Rhizoma fere nullum, caespitos densos efformans. *Folia* pauca, capillacea, culmum aequantia vel paullo breviora, mollia, glabra, 20—30 cm longa, ca. $^1/_2$ mm lata, praeter apicem subscaberulam laevia, subtus unicostata supra cellulosa, apice breviacuminata obsolete setulosa, intus basi ligulata; ligula brevis, ciliolata; vaginae 3—4 cm longae, glabrae, pallide virides, striatae, membranaceae, antice superne fuscae tenuimembranaceae, laeves, demum antice vix vel non fissae, dorso tereti subcarinatae. *Culmi* capillacei, compresso-ancipites, 30—40 cm alti, quam folia non latiores, laeves, glabri, tenuiter striati, basi vaginis 2—4 foliiferis cincti, innovationes intravaginales. *Anthelae* 3—10-spiculosae, laxae, 15—25 mm longae et latae, bracteis 2—3, superiora subsetacea brevis, ima subfiliformis 2—5 cm longa anthelam aequans usque duplo superans; radiis simplicibus unispiculatis vel pauci-(2—3)-spiculatis, ancipitibus, tenuissimis, laevibus, obsolete striatis, usque ad 15 mm longis; bracteolis squamiformibus, apice cuspide scabro recurvo terminatis. *Spiculae* solitariae, anguste ovatae, angulatae, laxiusculae, pauci-squamatae, clare fusco-brunneae, opacae, acutae, 4—5 mm longae 1.5(—2) mm latae. *Squamae* undique imbricatae, anguste vel ovato-oblongae, brunneae, opacae, glabrae, 2—2.5 mm longae, e dorso pallido subtrinervi acute carinato super apicem obtusum breviter recteque cuspidatae, lateribus membranaceis enerves, margine vix scariosae. *Stamina* 3; antherae breviter lineares, 0.4 mm longae, mucronatae. *Achenia* late obovata, angulo acutiusculo trigona, paullo a dorso compressa, facie plana, non verrucosa, 0.8 mm longa,

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Fig. 2. *Fimbristylis anisoclada* Ohwi — a. Habit, × ½; b. spikelet, × 5; c. achene, × 10; d. glume, × 10; e. style and stigmas, × 10; f. anther, × 10 — From *Van Steenis 8198* (BO) (see p. 120).

Fig. 3. *Fimbristylis perlaxa* Ohwi — a. Habit, × $^2/_5$; b. spikelet, × 4; c. achene (with persistent filaments and style), × 8; d. anther, × 8; e. glume, × 8; f. outer cells of achene — From *Thomsen 817* (BO).

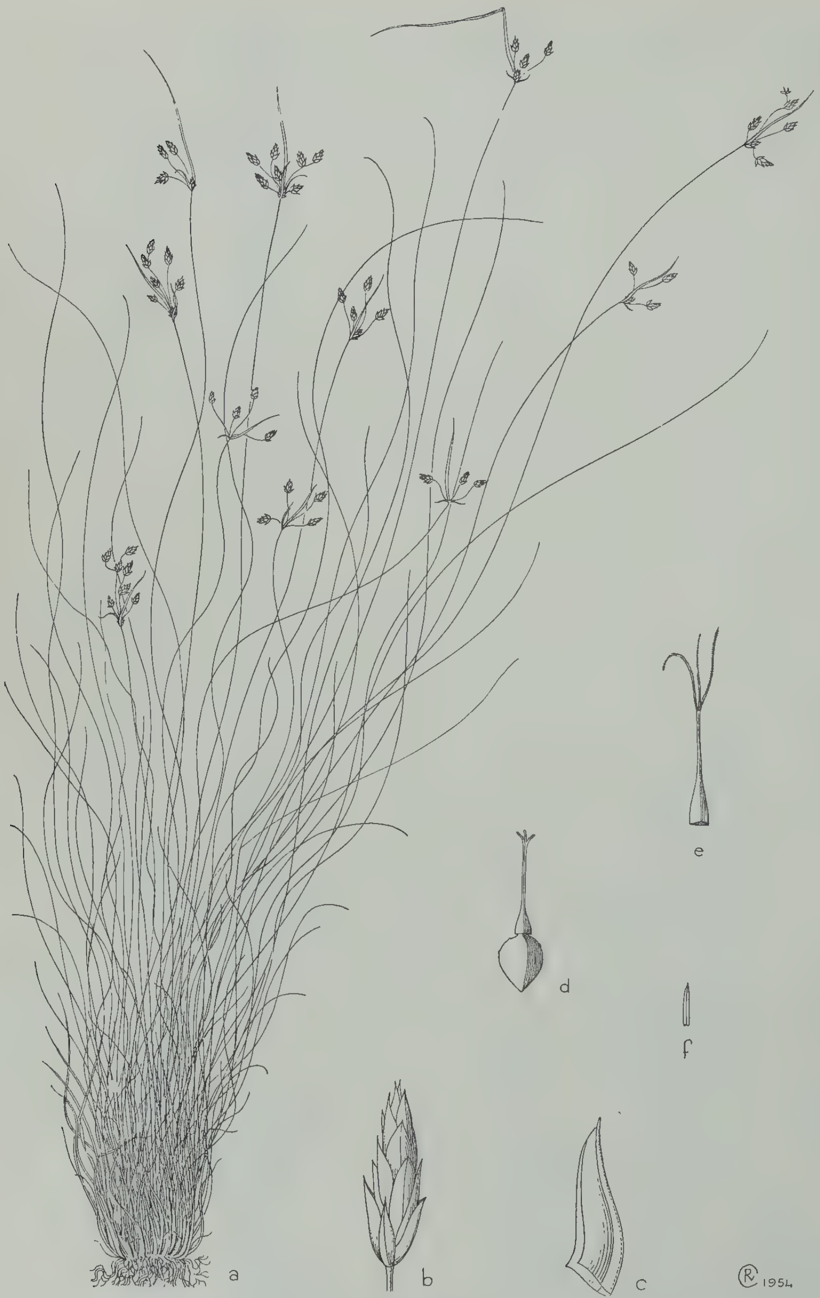

Fig. 4. *Fimbristylis capilliculmis* Ohwi — a. Habit, × ½; b. spikelet, × 5; c. glume, × 10; d. achene and style, × 10; e. style and stigmas, × 10; f. anther, × 10 — From *Pulle 332* (BO).

albida, paullo iridaceo-nitida, cellulis extimis obsoletis transverse ellipticis planis obsolete punctulata vel laevia; stylus tenuis, trigonus, glaber, 1.5 mm longus, inferne fere $^1/_3$ pyramidato-incrassatus, stigmatibus 3 pertenuibus obsolete papillosis 1.5 mm longis. — Affinis *F. complanatae* (Retz.) Link, sed habitu capillaceo, spiculis paucius florigeris brevioribus, squamis margine vix scariosis.

WEST NEW GUINEA. Beaufort River, riparian vegetation on loam, alt. 100 m, Nov. 12, 1912: *Pulle 332* (*type*, BO).

4. **Fimbristylis subdura** Ohwi, sp. nov. — Sect. *Autumnales* — *Fig. 5.*

Perennis, dense caespitosa, rhizoma breve lignosum multiculme. *Folia* culmo subbreviora, plana, rigidula, glabra, e basi 2.5—3 mm lata sursum sensim angustata, apice abrupte acutissima, margine scabra, subtus pluristriata ecostata, supra celluloso-paucistriata, intus basi eligulata sensim in vaginam transeuntia; vaginae brunneo-virides, ore antice tenuimembranaceo ferrugineo oblique fisso. *Culmi* rigiduli, laeves, striati, 40—50 cm alti, sub apice subcompressi 1.5 mm diam., glabri, angulo obtuso, inferne vaginis 1—2 subaphyllis vel brachyphyllis tubulosis apice oblique fissis 5—10 cm longis cincti. *Anthela* supradecomposita, ampla, 10 cm longa et lata, diffusa, laxiuscula, multispiculosa, bracteis 4—5 setaceis leviter curvatis 2—3 cm longis anthela multo brevioribus margine crebre scabris apice sensim angustatis supra basin 0.7—1.2 mm latis, bracteolis 1—1.5 cm longis setaceis angustis, radiis 6—10 inaequalibus compressis laevibus glabris usque ad 4—5 cm longis oblique patentibus, radiolis radiolulisque tenuibus sed firmulis. *Spiculae* solitariae, lanceolatae, teretes, acuminatae vel acutissimae, pauciflorae, rufo- vel brunneo-fuscae, 3—5 mm longae 1.2 mm latae, pedicellatae. *Squamae* undique imbricatae, late ovatae, obtusae, mucronatae, dure membranaceae, brunneae, paullo nitidulae, 1.7 mm longae, dorso obtuso 3-nerves, lateribus enerves, margine anguste albo-scariosae. *Stamina* 3; antherae breviter lineares, $^2/_3$ mm longae. *Achenia* late ovata, angulo obtusulo inflato-trigona, dense verrucosa, 0.6 mm longa, griseo-alba nitida, cellulis extimis transverse ellipticis impressis obsolete punctulato-reticulata; stylus trigonus, basi leviter dilatatus, 1.2 mm longus, stigmatibus 3 papillosis. — Habitu affinis *F. durae* (Zoll. et Mor.) Merr., a qua autem differt culmis inferne vagina subaphylla cinctis, bracteis brevibus, achenia verrucosa, cellulis extimis fere rotundatis.

CENTRAL JAVA: Gundik, N of Solo, teak-forest, alt. 200 m, Jan. 24, 1913, *Backer 6525* (*type*, BO); Forestry Manggar near Kedungdjati, teak-forest, alt. 50—100 m, Jan. 22, 1920: *Beumée 4901* (BO).

5. **Fimbristylis perlaxa** Ohwi, sp. nov. — Sect. *Aestivales* — *Fig. 3.*

Annua, caespitosa, multiceps. *Folia* culmo duplo vel $^1/_3$ breviora, mollia, planiuscula, 10—20 cm longa, 0.6—1.5 mm lata, extus ecostata paucistriata, intus glabra vel inferne puberula subcellulosa, apice breviacuminata vel acutissima, intus basi a vagina serie ciliarum limitata; vaginae molles, puberulae, teretes, ecarinatae, striatae, 3—7 cm longae, pallide virides, antice tenui-membranaceae brunneo-ferrugineae. *Culmi* graciles, laeves, glabri, obtuse trigono-compressi, 30—40 cm alti, basi vaginis paucis foliosis tecti. *Anthela* laxa, composita, plurispiculosa, 8—15 cm longa, bracteis setaceis, ima subelongata anthelam subaequanti erecta dorso inferne prophyllisque puberulis, bracteolis subsquamiformibus, radiis gracilibus com-

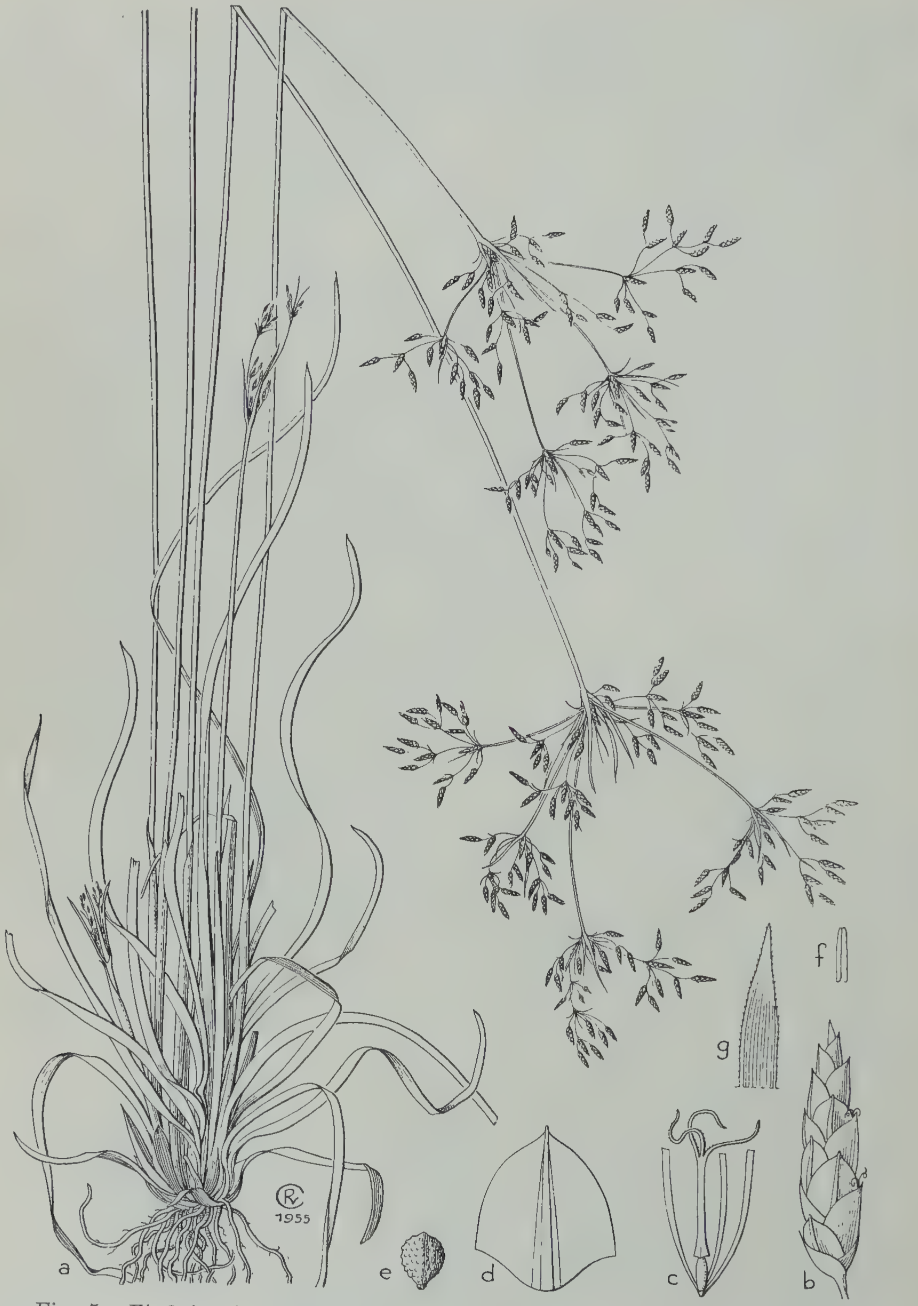

Fig .5. *Fimbristylis subdura* Ohwi — a. Habit, × ½; b. spikelet, × 5; c. deflorate flower, × 10; d. glume, × 10; e. achene, × 10; f. anther, × 10; g. tip of leaf, × 5 — From *Backer 6525* (BO).

pressis glabris laevibus suberectis usque ad 6 cm longis, radiolis gracilibus ascendentibus 10—20 mm longis. *Spiculae* solitariae, longe pedicellatae, late lanceolatae vel anguste oblongo-ovatae, leviter angulatae, acutissimae, densiuscule pluriflorae, clare brunneae, 6—8 mm longae 1.5—2 mm latae. *Squamae* ovatae, membranaceae, glabrae, laeves, undique imbricatae, adpressae, clare brunneae subnitidae, 2—2.5 mm longae, dorso laevissime carinato obsolete trinerves, margine vix hyalinae, apice breviter cuspidatae cuspide leviter recurvo laevi, latere obsoletissime pauci-nervulosae. *Stamina* 2; antherae oblongo-lineares, $^1/_3$ mm longae. *Achenia* elliptico-rotundata, biconvexa, stramineo-brunnea nitidula, brevistipitata, 0.8 mm longa, angulis acutiusculis, facie cellulis extimis transverse oblongis vel ellipticis longitudinaliter 15—18-serialibus leviter impressis minute trabeculata; stylus tenuis, 1 mm longus, basi leviter dilatatus, ramificationem non albo-extenuatum, breviter ciliatus, stigmatibus 2 tenuibus brevibus papillosis. — A *F. bisumbellata* (Forsk.) Buban. diversa culmis foliisque longioribus, anthela laxa, spiculis latioribus, achenio pluristriato, cellulis extimis minutis minus impressis. Planta Sect. *Aestivalem* et Sect. *Ferrugineam* conjunxit.

WEST NEW GUINEA: Mamberamo, in forest, alt. 40 m, Aug. 14, 1914, *Th. Thomsen 1817* (*type*, BO). — MOLUCCAS: Ceram, Amahái-Tíbu Ala, March 23, 1938, *Eyma 3153* (BO).

6. **Fimbristylis celebica** Ohwi, sp. nov. — Sect. *Aestivales* — *Fig. 6.* Annua, dense caespitosa, pluriceps. *Folia* culmum aequantia vel sublongiora, capillaria, curvata, $^1/_4$—$^1/_3$ mm lata, praeter apicem acutissimum margine scabrum laevia, glabra, paucistriata, leviter involuta; vaginae submembranaceae, dilatatae, breves, glabrae, pluristriatae, laeves, brunneostramineae. *Culmi* basi foliis paucis foliiferis cincti, subcompressi, folia vix latiores, laeves, glabri, leviter striati, 5—10 cm longi. *Spiculae* singulae, ebracteatae, oblanceolatae vel anguste oblongae, acutae, pauci—pluriflorae, erectae, angulatae, interdum oligostichae, albidae et saepius paullo castaneovariegatae, 5—6 mm longae, 2—2.2 mm latae. *Squamae* erectae, oblongolanceolatae, membranaceae, glabrae, laeves, acutiusculae, brevissime recte mucronatae, fere 3 mm longae, carina acuta pallida subtrinerves, lateribus albo-stramineae fusco-variegatae enerves, margine dilutiores non scariosae. *Stamina* 1—3; antherae lineares, 0.8 mm longae, apiculatae. *Achenia* obovata, inflato-biconvexa, margine acuta, basi sessilia, glabra, albida, vix nitida, 0.7 mm longa, cellulis extimis minutis obsoletissimis punctulatis vel fere laevia; stylus pertenuis, glaber, 1.2—1.5 mm longus, basi vix incrassatus, stigmatibus 2 papillosis 0.8 mm longis. — Habitu *F. pauciflorae* R. Br., sed differt spiculis numerosius floriferae, achenio glabro haud iridaceo-colorato, stylo bifido, et a *F. polytrichoidei* (Retz.) R. Br. foliis elongatis, achenio nec reticulato nec tuberculato ambitu obovato apice rotundato vix obtriangulato-obovato.

CELEBES. Res. Menado, subdiv. Posso, Pendolo, margin of Posso-Lake, Oct. 27, 1938: *Eyma 4113* (*type*, BO); Beao, Towuti-Lake, not rare in *Imperata*-fields, alt. 300 m, Aug. 1929: *Kjellberg 3749* (BO); Nóeha, margin of Matano-Lake, open, alt. 382 m, Aug. 11, 1938: *Eyma 3336* (BO).

7. **Fimbristylis wetarensis** Ohwi, sp. nov. — Sect. *Ferrugineae* — *Fig. 7.*

Perennis, dense caespitosa, pluriculmis. *Folia* culmo plus duplo breviora, plana, firmiuscula, acutissima vel breviter acuminata, 15—25 cm longa, 1—1.5 (vulgo 1.2) mm lata, supra cellulosa glabriuscula vel puberulo-scaberula, subtus striata puberula subunicostata, intus basi eligulata sensim in vaginam striatam puberulam vix carinatam transeuntia. *Culmi* obtuse leviterque striati, vix compressi, puberuli vel glabrescentes, 30—45 cm alti, apice erectim vel leviter oblique monostachyi bractea squamiformi praediti, inferne foliis paucis foliiferis cincti. *Spicula* lanceolata vel late lanceolata, teres, acuta, dense multiflora, clare rufo-brunnea, nitidula, 7—15 (demum usque ad 22) mm longa, 3—4 mm lata. *Squamae* oblongae, membranaceae, acutiusculae, glabrae, adpressae, mucronulatae, rufo-brunneae, inferne aureo-suffusae, nitidae, 5 mm longae, dorso non carinato pallide uninerviae. *Stamina* 3; antherae lineares, 2 mm longae. *Achenia* obtriangulato-obovata, biconvexa, apice rotundato-subtruncata, ex toto laxe humiliter verruculosa, albida vix nitida, 1.2 mm longa, cellulis extimis hexagono-rotundis minute reticulato-punctulata; stylus subtenuis, compressus, 4 mm longus, basi leviter dilatatus, angulo papilloso-ciliatus, margine vix extenuato a medio sursum albo-ciliatus, stigmatibus 2 tenuibus papillosis fere 2 mm longis.

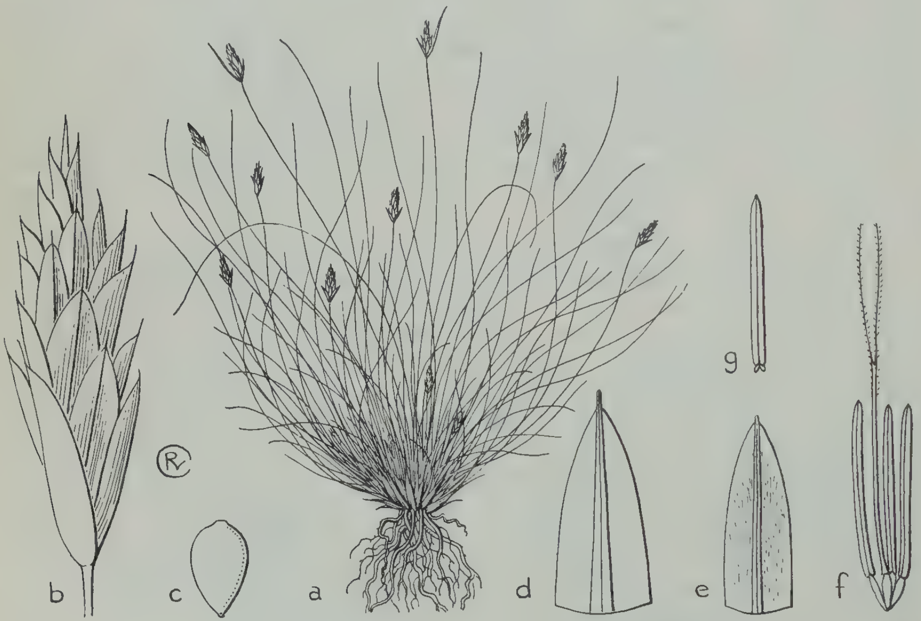

Fig. 6. *Fimbristylis celebica* Ohwi — a. Habit, somewhat reduced; b. spikelet, × 8; c. achene, × 16; d-e. glumes, × 8; f. flower, × 16; g. anther, × 16 — From *Eyma 4113* (BO).

LESSER SUNDA ISLANDS: Wetar, 24 km N of Ilwaki along Meta Lerai, above rain-forest in *Eucalyptus* savannah, 700—900 m, April 3—5, 1939: *Bloembergen 3567* (*type*, BO).

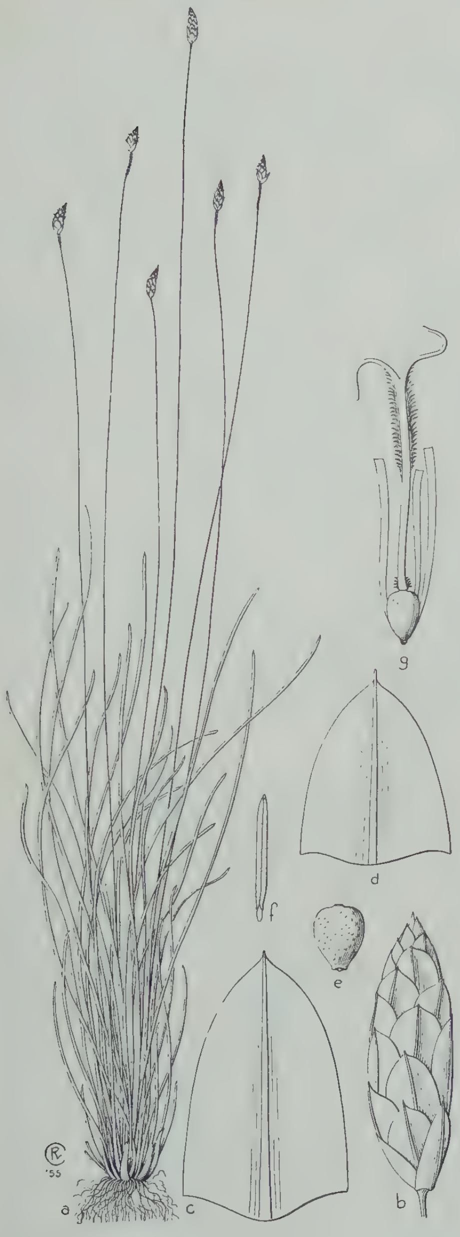

Fig. 7. *Fimbristylis wetarensis* Ohwi — a. Habit, × 3/8; b. spikelet, × 3; c-d. glumes, × 7; e. achene, × 7; f. stamen, × 7; g. deflorate flower, × 7 — From *Bloembergen 3567* (BO).

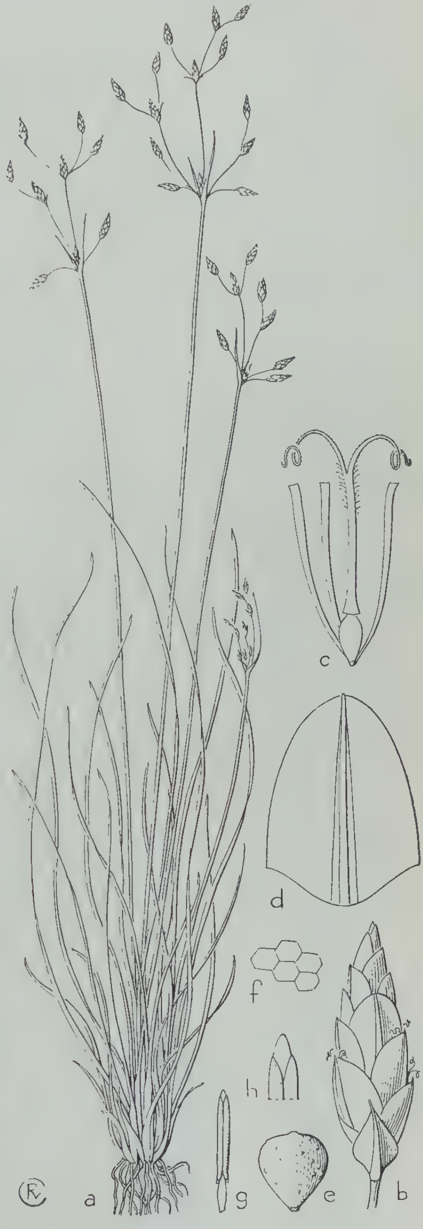

Fig. 8. *Fimbristylis semarangensis* Ohwi — a. Habit, × 3/5; b. spikelet, × 6; c. deflorate flower, × 12; d. glume, × 12; e. achene, × 12; f. outer cells of achene; g. stamen, × 12 — From *Koorders 42656 β* (BO).

8. **Fimbristylis sumbaensis** Ohwi, sp. nov. — Sect. *Ferrugineae* — *Fig. 9.*

Perennis, dense caespitosa, estolonifera. *Folia* culmo duplo breviora, erectiuscula, sursum subcircinata, plana, rigidiuscula, glauco-viridia, 1—1.2 mm lata, margine superne scabra, subtus striata, supra cellulosa et juventute adpresse puberula cito glabrata, apice breviacuminata, basi intus eligulata; vaginae striatae, ecarinatae, opacae, brunnescentes. *Culmi* tenues, compresso-trigoni, obtusanguli, striati, 30—40 cm alti, superne parce puberulo-scabri, inferne foliis paucis vel subpluribus foliiferis cincti. *Anthela* subcomposita vel composita, plurispiculosa, 3—5 cm longa, bracteis 2—3 setaceis brevibus ima anthelam paullo usque plus duplo longiore scabra, radiis inaequalibus ascendentibus compressis margine piloso-scabris usque ad 6 cm longis, radiolis breviusculis. *Spiculae* solitariae, ovatae vel oblongo-ovatae, subangulatae, acutae, dense pluriflorae, cinereo-brunneae, opacae, 4—6 mm longae, 2—2.5 mm latae. *Squamae* undique imbricatae, ovatae, membranaceae, acutae, mucronulatae, 2.5 mm longae, dorso carina viridi elevata crassa percursae, lateribus fulvo-fuscae enerves subnitidae, margine perlate dilutiores cinereo-suffusae, interdum ferrugineo-maculatae. *Stamina* 3; antherae lineares, acutae, 1.2 mm longae. *Achenia* late obovata, angulo subacuto inflato-biconvexa, glabra, albida, 0.7 mm longa et fere aequilata, cellulis extimis transverse brevilinearibus vix impressis subtilissime longitudinaliter 8—10-striata et transverse striolata; stylus tenuis, compressus, basi abrupte leviterque dilatata retrorso-hispidulus, a medio sursum laxe ciliatus, vix extenuatus, stigmatibus 2 tenuibus laxe papillosis. — An hybrida *F. sericea* R. Br. × *F. dichotoma* (L.) Vahl?

LESSER SUNDA ISLANDS. Sumba, Waingapu, open meadow or shaded, Feb. 2, 1940: *P. Hoekstra 3* (*type*, BO).

9. **Fimbristylis semarangensis** Ohwi, sp. nov. — Sect. *Ferrugineae* — *Fig. 8.*

Laxe caespitosa, estolonifera, glabra. *Folia* culmo 2—3-plo breviora, erecta, plana, firmula, 10—15 cm longa, praeter marginem superne scabram laevia, apice acuta, supra cellulosa, subtus striata ecostata, intus basi eligulata sensim in vaginam laevem striatam pallidam antice ferrugineam tenuimembranaceam transeuntia. *Culmi* obtuse compressi, laeves, striati, 20—40 cm alti, foliis non latiores, inferne foliis paucis laminiferis cincti. Anthela composita vel subcomposita, patens, laxe plurispiculosa, 3—5 cm longa et lata, bracteis 1—2, ima setacea erecta 1—2 cm longa 1 mm lata, radiis usque 4 cm longis inaequalibus compressis oblique ascendentibus laevibus, radiolis tenuibus interdum subexcurvis 5—10 mm longis. *Spiculae* solitariae, anguste ovatae, teretes, acutae, dense pluriflorae, 6—8 mm longae, 2 mm latae. *Squamae* ovatae, apice rotundatae, muticae, subnitidae, glabrae, laeves, levissime concavae, membranaceae, $2^1/_2$ mm longae, costa viridula angusta sub apice evanescente, lateribus enervibus clare rufo-brunneae, margine late albo-scariosae. *Stamina* 3; antherae lineares, 1 mm longae. *Achenia* latiuscule obovata, margine albido acutiusculo biconvexa, stramineo-brunnea, nitida, sparsim humiliterque verruculosa, 0.7—0.8 mm longa, cellulis extimis minutis transverse ellipticis vel subrotundis planis punctulato-reticulata vix longitudinaliter striata; stylus tenuis, compressus, non extenuatus, basi leviter dilatatus, margine superne $^1/_3$ breviter ciliatus, stigmatibus 2

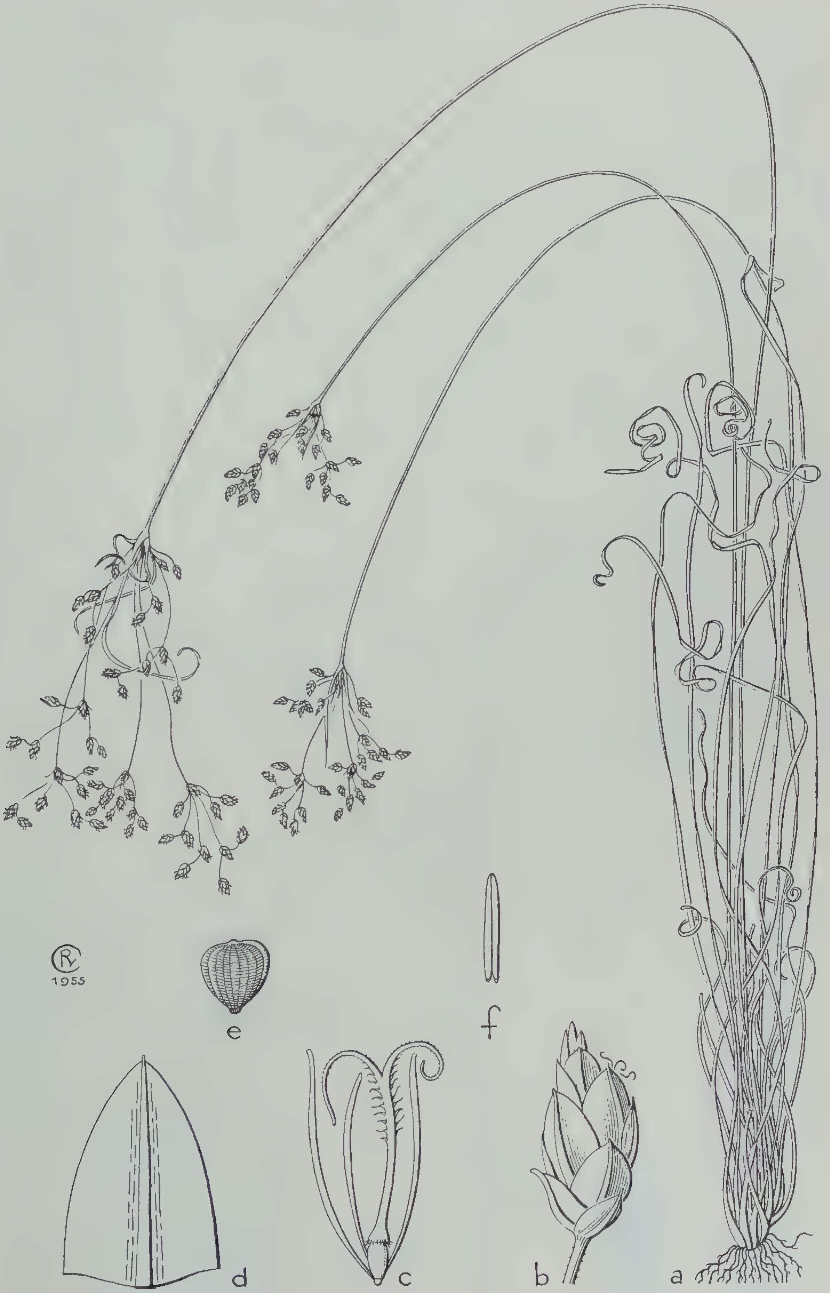

Fig. 9. *Fimbristylis sumbaensis* Ohwi — a. Habit, × ³/₅; b. spikelet, × 6; c. deflorate flower, × 12; d. glume, × 12; e. achene, × 12; f. anther, × 12 — From *Hoekstra 3* (BO).

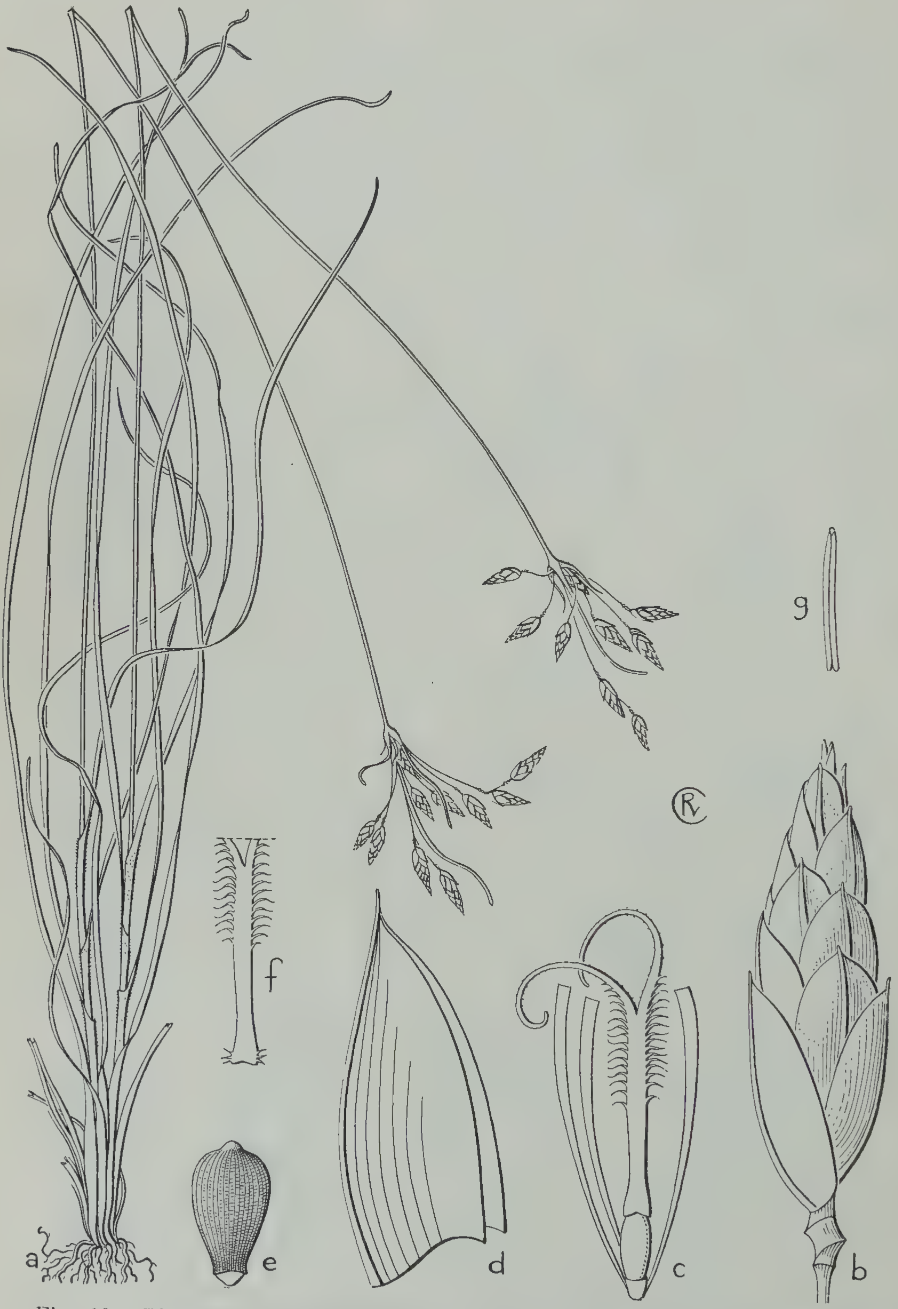

Fig. 10. *Fimbristylis lineatisquama* Ohwi — a. Habit, × $^3/_5$; b. spikelet, × 6; c. deflorate flower, × 12; d. glume, × 12; e. achene, × 12; f. style, × 12; g. anther, × 12 — From *Merrill BS 11546* (BO).

pertenuibus 1 mm longis parce papillosis. — Species inter Sect. *Aestivalem* et Sect. *Ferrugineam* ambiguit.

Central Java. Res. Semarang, Bledug Kuwu, in saline pools, Feb. 20, 1914: *Koorders 42656 β* (*type*, BO).

10. **Fimbristylis lineatisquama** Ohwi, sp. nov. — Sect. *Ferrugineae* — *Fig. 10.*

Perennis, caespitosa. *Folia* culmo duplo breviora, falcata, basi latiore, sursum levissime angustata, plana, rigidula, 1.5—2 mm lata, margine scabra inferne parce ciliato-pilosa, supra cellulosa, subtus striata, dorso inferne dense pilosa, intus inferne ligula dense puberula a vagina distincta; vaginae pallide striatae, sursum densius pilosae. *Culmi* compresso-trigoni, striati, parce puberuli vel glabri, ca. 40 cm alti, inferne foliis paucis laminiferis cincti. *Anthela* simplex vel subcomposita, pauci—plurispiculosa, 2—5 cm longa, bracteis paucis setaceis ima longitudine anthelae basi dense pilosa margine scabra, radiis paucis compressis laevibus glabris superne saepe fusco-maculatis 2—2.5 cm longis. *Spiculae* solitariae, oblongo-ovatae vel late lanceolatae, teretes, acutae, pluri—multiflorae, sordide brunneae, 7—10 (demum ad 14) mm longae, 2.5—3 mm latae. *Squamae* oblongo-ovatae, tenui-membranaceae, glabrae, laeves, 4—4.5 mm longae, ex toto tenuiter sed elevato-multinervulosae, sordide brunneae, apice obtusae minute cuspidatae, adpressae, non carinatae. *Stamina* 3; antherae lineares, 1.8 mm longae. *Achenia* obovata vel oblongo-obovata, angulo obtusulo inflato-biconvexa, glabra, griseo-brunnescentia, 1.5 mm longa, cellulis extimis rotundatis vix impressis obsolete longitudinaliter 14—16-striolata et multilineolata; stylus latiusculus, compressus, 2 mm longus, basi leviter abrupteque dilatatus, a medio sursum ciliatus, stigmatibus 2 tenuibus papillosis fere 2 mm longis.

Philippines. Sulu Islands, Golo (Jolo), Aug. 1922, *Merrill BS 11546* (*type*, BO).

Index to collectors' numbers

Backer 6525: 4; Beumée 4901: 4; Bloembergen 3567: 7.
Eyma 3153: 5; 3336: 6; 4113: 6.
Henderson SF 29052: 1; Hoekstra 3: 8.
Kjellberg 3749: 6; Koorders 42656 β: 9.
Merrill BS 11546: 10.
Noerkas (exp. van Vuuren) 218: 2.
Pulle 332: 3.
Thomsen 1817: 5.

Index to scientific names

Fimbristylis
— **anisoclada** Ohwi *2
— **capilliculmis** Ohwi *3
— **celebica** Ohwi *6
— **lineatisquama** Ohwi *10
— **malayana** Ohwi *1
— **perlaxa** Ohwi *5
— **semarangensis** Ohwi *9
— **subdura** Ohwi *4
— **sumbaensis** Ohwi *8
— **wetarensis** Ohwi *7

FLORAE MALESIANAE PRECURSORES X
NOTES ON MALAYSIAN AND SOME S. E. ASIAN CYPERACEAE III [1]

by

J. H. KERN
(Flora Malesiana, Leiden)

(Issued 31. XII. 1955)

This third paper on Malaysian Cyperaceae chiefly discusses new and otherwise noteworthy species of *Fimbristylis.* In addition a key to the Malaysian species of the genus and a survey of their arrangement as accepted for the Flora Malesiana are given. A few new species are described from Siam and Indo-China.

I am greatly indebted to the Directors of the Herbaria who granted me the opportunity to study the collections of their institutions.

I. NOTES ON FIMBRISTYLIS

1. **Fimbristylis thomsonii** Boeck., Linnaea 37, 1871, 37; Merr., En. Philip. Fl. Pl. 1, 1923, 127. — *F. asperrima* (non Boeck.) Ridl., Fl. Mal. Pen. 5, 1925, 158, quoad specim. P. Rawei.

For the Malaysian area this species has only been recorded from the Philippines (Palawan). It occurs also in North and Central Sumatra and in the Malay Peninsula. Apparently it is everywhere very rare.

SUMATRA. N. Sumatra, Karo Plateau, grassy wilderness on E. Siosar, 1350—1500 m: *Lörzing 8597* (BO, L); Mt Piso-Piso, NW of Toba-Lake, swampy to moist grassy localities, 1400 m: *Lörzing 8389* (BO); W. Batuhuda, hilly country, moist grassy field, 1200 m: *Lörzing 8028*; Bosar Si Pinggan to Bangun Dolok, Asahan: *Hamel 1196* (NY). Central Sumatra, Mt Sago, 1080 m: *Bünnemeijer 3715* (BO).

MALAY PENINSULA. Kedah, Rawei Island: *Ridley 15720* (BM, K, SING).

PHILIPPINES. Palawan, Taytay, on dry open slopes bordering thickets: *Merrill 9350* (BM, BO, K, L, NY, P, SING). Luzon, Bontoc Subprov.: *Vanoverbergh BS 1183* (P; the same number in FI is *F. complanata*).

A specimen "Route to Merapi": *Horsfield s.n.* (SING) was collected in Central Java, or possibly in S. Sumatra (Palembang Highlands). It was referred to as *F. fusca* Benth. by Ridley in J. As. Soc. Str. Br. 59, 1911, 223.

2. **Fimbristylis consanguinea** Kunth, En. Plant. 2, 1837, 228; Steud., Syn. Plant. Glum. 2, 1855, 113. — *F. kraussiana* Hochst. ex Krauss, Flora 28, 1845, 757, pro synon. (nom. inval.); Hook. f. in Trimen, Handb. Fl. Ceylon 5, 1900, 63; Chermezon, Fl. Madag., fam. 29, 1937, 185. — *F. con-*

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[1] I in Reinwardtia 2, 1952, pp. 97—130; II in Reinwardtia III, 1954, pp. 27—66.

nectens Thwaites, En. Pl. Zeyl. 1864, 349. — *F. complanata* var. *kraussiana* (Krauss) C. B. Clarke, Fl. Br. Ind. 6, 1893, 646. — *F. horsfieldii* C. B. Clarke, Kew Bull. Add. Ser. 8, 1908, 25. — *F. paupercula* (non Boeck.) Kük., Candollea 6, 1936, 426. — *F. monticola* (non Steud.) Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 25.

As far as known *F. consanguinea* extends from S. Africa and Madagascar through India and Ceylon to Malaysia (W.—E. Java). In the herbaria it has often been confounded with the closely allied *F. complanata* (Retz.) Link, from which it can easily be distinguished by the characters given in the key on p. 152.

It occurs in swamps, swinging bogs, on margins of lakes between 1600 and 2300 m. None of the other Malaysian species of *Fimbristylis* reaches this altitude. In Ceylon *F. consanguinea* occurs also in the montane zone above 1200 m, in Madagascar it ascends to 1600 m.

The name *F. kraussiana* Hochst. ex Krauss was not validly published, since it was not accepted by its author, but considered to be synonymous with *F. complanata*. Besides, it is antedated by Kunth's binomial.

S. Africa. Cape of Good Hope: *Drège s.n.* (*type coll.*) (L).

Ceylon. *Thwaites CP 2967* (*type coll.* of *F. connectens* Thwaites) (K).

Java. W. Java, Mt Ipis, Tegal Primula, grassy plain, 2300 m: *Docters van Leeuwen 13353* (BO); Priangan, Mt Patuha near Telaga Patenggang, pool, 1650 m: *Backer 12789* (BO, K, L, SING, U); same locality, swampy margin of lake: *Backer 12817* (BO); Mt Patuha, Rantja Upas, swamp, dominant: *Van Steenis 7424* (BO); Mt Papandayan, Tegal Pandjang, swampy valley, dominant, 2041 m: *Van Steenis 4217* (B, BO, L); same locality, Tegal Alun Alun: *Van Steenis 4292* (B, BO, L); Mt Djaya, N of Mt Papandayan, Tegal Mariuk, 2200 m: *Van Steenis 4357* (BO). Central Java, Mt Dieng, Telaga Balekambang, 2000 m: *Van Steenis 4533* (BO, L); Dieng: *Warburg 3541, 3542* (US); Dieng, Telaga Pengilan: *Ruttner 282* (BO); Mt Dieng, swamp, 2050 m: *Hochreutiner 2439* (B); Mt Prahu: *Horsfield 1073* (BM, *type* of *F. horsfieldii* C. B. Clarke; SING). E. Java: Besuki, Yang Plateau, Taman Hidup, swampy grassland, in large clumps as *Carex nubigena* and *Rhynchospora glauca*, 1900 m: *Van Steenis 10907* (BO, L).

3. **Fimbristylis microcarya** F. v. M., Fragm. Phyt. Austral. 1, 1859, 200; Benth., Fl. Austral. 7, 1878, 316; S. T. Blake, Univ. Queensl. Papers Dept. Biol. 1, 3, 1937, 93; J. Arn. Arb. 35, 1954, 216. — *F. complanata* var. *microcarya* (errore "*microcarpa*") (F. v. M.) C. B. Clarke, Fl. Br. Ind. 6, 1893, 646; Domin, Bibl. Bot. 20, Heft 85, 1915, 462. — *F. autumnalis* var. *microcarya* (F. v. M.) Kük., Bot. Jahrb. 69, 1938, 258. — *F. quinquangularis, forma abludens* Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 26.

A very rare species in Malaysia, previously only reported from Papua by Kükenthal (1938) and Blake (1954). It was also collected in Java and the Philippines.

Although undoubtedly related to *F. complanata*, it strikingly resembles *F. quinquangularis* by its general habit and very small spikelets. *F. microcarya* lacks the bladeless cauline leaves of the latter and besides, it is recognizable by the dense fringe of short white hairs representing the ligule (see p. 119), the acute glumes, and the nuts not densely verruculose but smooth or with only a few warts, and finely lineolate by the transversely linear-oblong outer cells superposed in 4—6 vertical rows on each face.

E. JAVA. Wonokitri near Surabaya, Gunung Sahari: *Dorgelo 1712* (L); precise locality unknown: *Backer c.s. 3269* (L).

PHILIPPINES. Luzon, Prov. of Rizal: *Ramos BS 12523* (BM, G, K, P); Prov. of Cavite, Mendez Nuñez: *Mangubat BS 1327* (NY, US).

NEW GUINEA. Papua, Port Moresby, *Carr 11847* (K, L, SING).

4. **Fimbristylis scaberrima** Nees in Wight, Contr. Bot. Ind. 1834, 102; Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 13, p.p.; Linnaea 38, 1874, 408; C. B. Clarke, Fl. Br. Ind. 6, 1893, 637; J. Linn. Soc., Bot. 34, 1898, 60.

This species is, according to Clarke (1898), endemic in Sylhet and probably only once collected. I have also seen it from Indo China and Malaysia. It has been repeatedly collected in Borneo, first by Teysmann, but it is much rarer in Sumatra and Java.

Because of its bifid style and biconvex nut Nees placed it in *Fimbristylis*, not in the genus *Trichelostylis* comprising our *Fimbristylis spp.* with trifid style. Accordingly Clarke referred it to Sect. *Dichelostylis*, in pointing to the fact that from the flattened top of the stem and the small spikelets it had been sometimes referred to *F. complanata*. The relations to the latter species can not be denied, but it shows a still closer affinity to *F. dura*, with which the Malaysian specimens were confounded.

INDIA. Sylhet: *Wallich 3507c* (*type coll.*) (L).

INDO CHINA. Cambodia: *Godefroy 50* (P).

SUMATRA. Res. Djambi, Lake Sipin near Djambi, dominant: *Rutten-Kooistra S 1* (BO, L).

W. JAVA. Banten, Rawa Bodjong, S. of road Tangerang-Serang, near Tigaraksa, edge of swamp forest: *Van Steenis 12565* (BO, L).

BORNEO: *Chaper s.n.* (P). W. Borneo, B. Singkadjang: *Teysmann 10944* (BO, L); margin of Sendabai Lakes near Tayan: *Main 1710 (exp. Polak)* (BO, L); Lake Tayan: *Main 1749* (BO, L); Sungai Sendebai: *Main 1819* (BO, L, SING); near Selimbau, forest, common: *Main 1844* (BO, L). S. and E. Borneo, W. Kutei, Lahun, in open rapak forest, dominant: *Endert 1836* (B, BO, SING); Tandjong Isui, margin of lake, dominant: *Endert 1982* (BO, L).

5. **Fimbristylis pierotii** Miq., Ann. Mus. Lugd. Bat. 2, 1865, 145; Boeck., Linnaea 37, 1871, 32; C. B. Clarke, Fl. Br. Ind. 6, 1893, 642; Ohwi, Mem. Coll. Sc. Kyoto B 18, 1944, 65. — *F. pinetorum* Merr., Philip. J. Sc. 9, 1914, Bot. 266; En. Philip. Fl. Pl. 1, 1923, 125.

The specimens on which Miquel based this species (leg. Von Siebold, Bürger, Keiske, and Pierot) are all preserved in the Leiden Herbarium. I have chosen "No 8. *Scirpus*. Tentsuki, Japonia, *v. Siebold*" as the lectotype (L, sub no 902.79—52).

Merrill 7664, the type collection of *F. pinetorum* Merr., and *Merrill Phil. Pl. 558*, distributed as *F. pinetorum*, are identical with the collections cited by Miquel.

The species ranges from India (NW. Himalaya, Simla, Kumaon), Korea, and Japan (Hondo, Shikoku, Kiushiu) to the Philippines (N. Luzon).

PHILIPPINES. Luzon, Benguet Subprov.: *Merrill BS 7664* (P, US), *Merrill Phil. Pl. 558* (FI, G, U, US).

6. **Fimbristylis insignis** Thwaites, En. Pl. Zeyl. 1864, 349; C. B. Clarke, Fl .Br. Ind. 6, 1893, 645; Camus, Fl. Gén. I. C. 7, 1912, 118; S. T. Blake, J. Arn. Arb. 35, 1954, 215. — *F. thwaitesii* Boeck., Linnaea 37, 1871, 34. — *F. longispica* (non Steud.) Ridl., Fl. Mal. Pen. 5, 1925, 156, p.p. — *F. petrogena* Ohwi, Bot. Mag. Tokyo 56, 1942, 201.

Recorded by Clarke (1893) for Borneo and recently by Blake (1954) for Papua. It appears that *F. insignis* occurs at several remote localities almost throughout Malaysia. Outside this area it was collected in Ceylon, Siam, Tonkin, Cochin China, S. China, and tropical Australia. Dr Ohwi kindly sent me some photographs of the type specimen of *F. petrogena* Ohwi, preserved in the Kyoto Herbarium. I am convinced that it belongs to *F. insignis*, as I already supposed to be so on account of the original description.

Thwaites described the style as glabrous. However, in the specimens of *CP 3317* (*type collection*) I have seen, the style is distinctly ciliate, as in most specimens examined. Sometimes I found the style thinly membranously margined, only in *Vesterdal 228* it is quite glabrous.

MALAY PENINSULA. Setul, heaths: *Ridley 14820* (BM, K, SING). Kedah: *Vesterdal 228* (C).

N. BORNEO: *Burbidge s.n.* (BM, K); Jesselton, open eroded hillside, 15 m: *R. H. Forster S 18* (K).

PHILIPPINES. Calamianes, between Culion and the "Negative Barrio", Culion Island: *Bartlett 15550* (GH). Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32811* (BO). Panay, Antique Prov.: *MacGregor 32233* (K, P, US).

CELEBES. SE. Celebes, Timampu, rather common, 300 m: *Kjellberg 3748* (BO); Rumbia, Wambakowu, monsoon forest, 40—130 m: *Elbert 3088* (L).

NEW GUINEA. W. New Guinea, Hollandia: *Baim s.n.* (GH); Hollandia, open places in savannah: *Van Royen 4146* (L); Waren, 60 miles S of Manokwari, in open rocky grass-field by the sea-shore, very rare: *Kanehira & Hatusima 13182* (*type* of *F. petrogena* Ohwi) (KYO, n.v.; photographs in L). Papua, W. Div.. Mai Kussa R.: *W. MacGregor in 1890* (acc. to Blake, 1954, n.v.). Misool, Sorong, near Fakal, steppe scattered, 40 m: *Pleyte 1120* (BO, K, L, SING).

7. **Fimbristylis falcata** (Vahl) Kunth, En. Plant. 2, 1837, 239; Miq., Fl. Ind. Bat. 3, 1856, 326; Boeck., Linnaea 37, 1871, 48; F.-Vill., Nov. App. 1882, 308. — *Scirpus falcatus* Vahl, En. Plant. 2, 1806, 275. — *F. brevifolia* Presl, Rel. Haenk. 1, 1828, 192, non R. Br., 1810. — *F. brachyphylla* Presl, Rel. Haenk. 1, 1830, 351, non Schult., 1827. — *Trichelostylis junciformis* Nees in Wight, Contr. Bot. Ind. 1834, 106.— *F. haenkei* Presl ex Dietr., Sp. Pl. 2, 1833, 161; Syn. Pl. 1, 1839, 201. — *F. junciformis* (Nees) Kunth, En. Plant. 2, 1837, 239; Miq., Fl. Ind. Bat. 3, 1856, 327; Boeck., Linnaea 37, 1871, 49; C. B. Clarke, Fl. Br. Ind. 6, 1893, 647; Philip. J. Sc. 2, 1907, Bot. 97; Camus, Fl. Gén. I. C. 7, 1912, 119; Merr., En. Philip. Fl. Pl. 1, 1923, 123, excl. syn. Retzii; Kük., Bot. Jahrb. 59, 1924, 50.

F. falcata is often confounded with *F. cymosa*, to which it is very similar in habit. It is easily distinguishable by the broad scarious margins of the glumes, the whitish (not blackish) nut, and the distinctly produced connective setulose at the top.

In Malaysia it is very rare, and up to the present only known from the localities cited below.

Outside Malaysia it is known from Madagascar, India, and Indo China.

PHILIPPINES: *Haenke*, (*Presl*, acc. to Clarke, 1907), not seen. Luzon: Ilocos Norte Prov., Burgos: *Ramos BS 32737* (BM, BO, P); Manila: *Calléry in 1840* (P).

NEW GUINEA. NE. New Guinea, Sepik Distr., Dagua Airstrip, W. of Wewak: *Pulsford 7* (L; the same number in BM is *F. dichotoma* Vahl); Morobe Distr., Vicinity of Kajabit Mission, grassland, 270 m: *Clemens 10750* (GH). New Britain, Gazelle Peninsula: *Lauterbach 247* (cited by Kükenthal, 1924, as 274?) (SING).

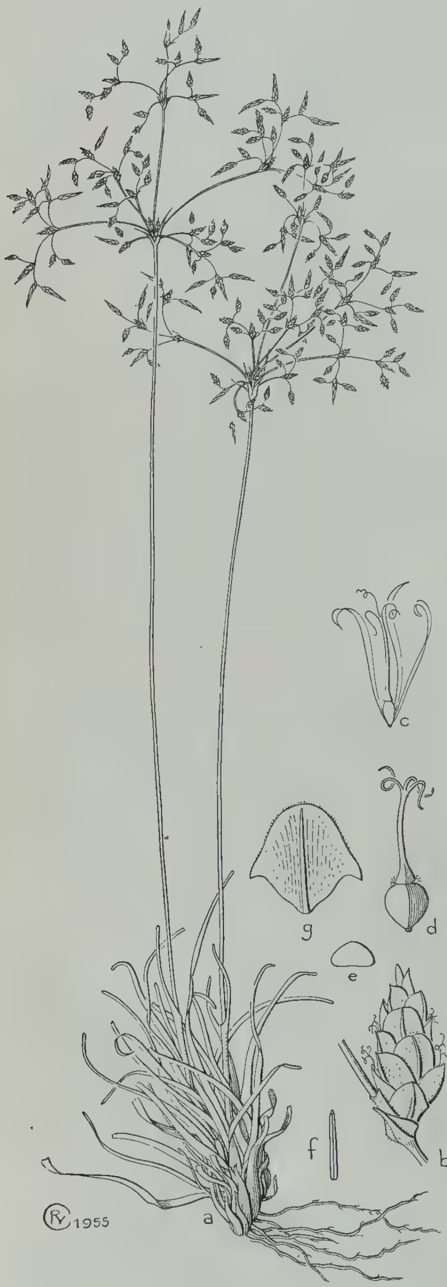

Fig. 1

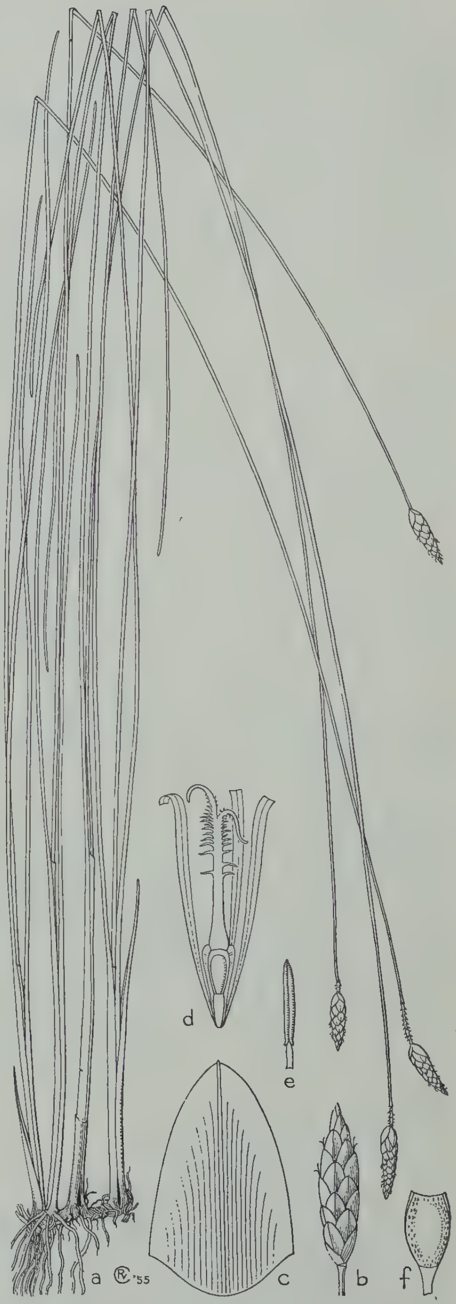

Fig. 2

8. **Fimbristylis lasiophylla** Kern, spec. nov. — *F. nigrobrunnea* (non Thwaites) Camus, Fl. Gén. I.C. 7, 1912, 120, p.p. — Sect. *Cymosae* Ohwi — *Fig. 1.*

Perennis, rhizomate repente crasso lignoso vaginis stramineis vel ferrugineis dissolutis circumdato. *Culmi* solitarii vel subsolitarii, erecti, rigidiusculi, obtusanguli, sulcati, glabri laevesque, ad basin vaginis 2—3 tubulosis usque ad 5 cm longis laminis brevibus $1^1/_2$—2 cm longis praeditis cincti, 20—30 cm alti, 1—$1^1/_2$ mm crassi. *Folia* basalia cinereo-viridia, culmo multo breviora, crassiuscula, rigida, erecta vel saepe falcata, plana, in sicco marginibus involutis, obtusiuscula vel abrupte acuminata, supra minute celluloso-reticulata glabra vel sparse pilosa, subtus pluristriata pilis albis oblique patentibus dense pubescentia, $1^1/_2$—$2^1/_2$ mm lata; laminae intus ad basin eligulatae, sensim in vaginam transeuntes. *Anthela* composita, decomposita vel supradecomposita, late ovata, diffusa, laxa, multispiculata, 7—10 cm longa et lata. Bracteae involucrales brevissimae, oblique erectae, pubescentes, ima 1—$1^1/_2$ cm longa. Anthelae radii 6—11, graciles, patentes, glabri laevesque, usque ad 7 cm longi. *Spiculae* solitariae, raro 2—4 aggregatae, ovatae vel oblongae, angulatae, acutiusculae, densiuscule pluriflorae, 3—6 mm longae, $1^1/_2$—2 mm latae. Rhachilla distincte alata. *Glumae* spiraliter dispositae, membranaceae, undique imbricatae, adpressae, late ovatae, obtusae, paullo infra apicem minute mucronulatae, carinatae, pubescentes, in dorso ferrugineo tenuiter nervatae, nervo medio prominente, late hyalino-marginatae, $1^1/_2$—$2^1/_2$ mm longae, $1^1/_2$—2 mm latae. *Stamina* (2—)3, antheris linearibus 1—$1^1/_2$ mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, triqueter, ad basin pyramidato-incrassatus, sparse ciliatus vel fere glaber, 1—$1^1/_4$ mm longus, stigmatibus 3 quam stylus longioribus. *Nux* obtuse compresso-trigona, obovata vel late elliptica, breviter stipitata, vix umbonulata, cellulis extimis transverse oblongis subimpressis minute cancellata, brunnea, 0.7—0.9 mm longa, 0.6—0.7 mm lata.

Allied to *Fimbristylis sericea* R. Br., but differing in several important characters. Like in *F. sericea* the leaves are densely pubescent on the under side; however, the hairs are not strongly appressed as in *F. sericea*, but obliquely patent. The dry leaves of *F. sericea* are revolute, those of *F. lasiophylla* involute. The much smaller spikelets of *F. lasiophylla* are nearly all solitary, sometimes only some of them are placed in clusters of 2—4. The much less distinctly nerved glumes are only $1^1/_2$—$2^1/_2$ mm long., in *F. sericea* $2^1/_2$—4 mm. The connective is smooth, not setulose at the top as is the case in *F. sericea*. The style is more slender, and there are always 3 stigmas, whereas in Asiatic *F. sericea* digynous flowers by far prevail. Accordingly the nuts are trigonous, not biconvex; they are much smaller and finely cancellate (smooth in *F. sericea*).

Possibly due to attack of a parasite the spikelets in *Clemens 3002*

Fig. 1. *Fimbristylis lasiophylla* Kern — a. Habit (spikelets partly elongate by attack of a parasite), × ½; b. spikelet, × 5; c. deflorate flower, × 10; d. nut (with style and stigmas), × 10; e. transverse section of nut, × 10; f. anther, × 10; g. glume, × 10. — From *d'Alleizette s.n.* (L).

Fig. 2. *Fimbristylis subalata* Kern — a. Habit, × ½; b. spikelet, × 1; c. glume, × 5; d. flower, × 5; e. stamen, × 5; f. nut, × 5. — From *Brass 7846* (GH).

and *3224* are more or less comose by the strongly elongate sterile upper glumes. Such deformed spikelets often occur in *F. globulosa* (Retz.) Kunth, *F. dichotoma* (L.) Vahl, and *F. dura* (Zoll. et Mor.) Merr.

Indo China. Annam; Tourane, Nov. 12, 1911: *Lecomte & Finet 954* (P); Tourane and vicinity, common in the dune region, May—July 1927: *J. & M. S. Clemens 3002, 3224* (U); environs de Nha-trang, sables près de la mer, 9—11 juin 1909: *Ch. d'Alleizette s.n.* (*type*) (L, sub no 951.74—626).

9. **Fimbristylis obtusata** (C. B. Clarke) Ridl., Fl. Mal. Pen. 5, 1925, 157. — *F. tenera* var. *obtusata* C. B. Clarke, Fl. Br. Ind. 6, 1893, 642; J. Linn. Soc. Bot. 34, 1898, 63; Ridl., J. Str. Br. R. As. Soc. 46, 1906, 224; Mat. Fl. Mal. Pen. 3, 1907, 94; Merr., Bibl. En. Borneo 1921, 62. — *F. nigrobrunnea* var. *thorelii* Camus, Not. Syst. 1, 1910, 248, p.p.; Fl. Gén. I. C. 7, 1912, 121, p.p.

A survey of the distribution of this species is given below. As for the Malay Peninsula, most records were already given by Ridley (1907).

F. nigrobrunnea var. *thorelii* Camus has nothing to do with *F. nigrobrunnea*. Of the specimens in the Paris Herbarium named as such by Camus, *Thorel 556* belongs to *F. obsusata*; *Balansa 2855* and *Thorel s.n.* I might refer to *F. straminea* Turr., with the type of which it agrees fairly well, except for the single stamen and the nut somewhat truncate-depressed at the top.

Lower Bengal: *Wallich, Kurz* (K).

Lower Birma. Rangoon: *Bouquet s.n.* (L).

Cochin China: *Thorel 556* (P).

Sumatra: *Waitz s.n.* (most probably mislabelled) (L).

Malay Peninsula. Kedah, P. Langkawi: *Nauen s.n.* (SING). Pahang: *Ridley 1740c* (not seen). Malacca: *Ridley 1740a* (K, SING), *1740b* (BM). Johore: *Vesterdal 268* (SING). Penang: *Curtis 1867* (SING), *Didrichsen 3455* (C), *Nauen SF 37487* (BO, GH, K, SING), *Nur SF 4513* (K, SING), *5272* (BO, L, SING), *s.n.* (US). Singapore: *Hullett in 1894* (SING), *Nur s.n.* (SING), *Ridley 83* (K, SING), *1740* (SING), *8430* (K, SING), *s.n.* (SING), *Sinclair s.n.* (BO, L).

Borneo. Sarawak, Kuching: *Miss Hose 20 I* (SING), *s.n.* (SAR). W. Borneo: *Hallier 740* (BO). S. and E. Borneo: Bandjermasin: *Motley 85* (K). Br. N. Borneo: *Burbidge s.n.* (BM, K); Jesselton: *Topping 1456* (P, US); Mt Kinabalu, Dallas, 900 m: *Clemens 27681* (B, BM, BO, K, L, NY, SING).

10. **Fimbristylis schultzii** Boeck., Linnaea 38, 1874, 391; Benth., Fl. Austral. 7, 1878, 320 ("316"); S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 45. — *F. platystachys* Boeck., Linnaea 38, 1874, 390; Domin, Bibl. Bot. 20, Heft 85, 1915, 464. — *F. platystachys* var. *schultzii* (Boeck.) Domin, l. c.

The two *Fimbristylis* collections from the Lesser Sunda Islands I have here provisionally referred to *F. schultzii* Boeck., I am still puzzled at. In *Iboet 358a* from Sumba the mucros of the glumes are rather short, only slightly spreading, the nuts 0.6—0.7 mm long and 0.4—0.5 mm wide, not verruculose, almost elliptic in cross-section, blackish, with thick-walled hexagonal to transversely oblong impressed outer cells. In my opinion they perfectly agree with the type collection of *F. schultzii* (*Schultz 96*; K!). In *Van Steenis 7586* from Bali, however, the spikelets are strikingly squarrose by the longer recurved awns, the whitish nuts are slightly larger (0.75 × 0.65 mm), densely verruculose, and more equally trigonous.

The only Australian collection in the Leiden Herbarium distributed as *F. schultzii* is *Specht 20* from N. Australia. In habit it is very similar to the Van Steenis collection, but not identical with the latter, the glumes, anthers, and style being larger, the upper margins of the glumes microscopically fimbriate-dentate, and the connective slightly bristly at the top. *Specht 20* seems to be identical with *Schultz 792*, the type collection of *F. platystachys* Boeck., as far as I can judge from the very young specimens of this collection in the Kew Herbarium. *F. schultzii* and *F. platystachys* were considered conspecific by Blake (1947).

The decision whether the Iboet and the Van Steenis collections are specifically distinct must be postponed until more material is available.

Lesser Sunda Islands. Bali, Gilimanuk, in grassy fields, 1 m: *Van Steenis 7586* (BO, L). Sumba, Waikolo, *Iboet 358a* (BO).

11. Fimbristylis miliacea L. var. **macrostachya** Kern, var. nov.

A typo differt spiculis majoribus 5—10 mm longis 3 mm latis, glumis c. $2^{1}/_{4}$ mm longis $1^{2}/_{5}$ mm latis, staminibus 3.

Because of the larger spikelets and the longer glumes this remarkable variety has been mistaken for *F. globulosa* (Retz.) Kunth. On account of the equitant leaves grooved on the inner margin 1)), the narrowly hyaline-margined glumes, the rhachilla not ragged by wings after the fall of the glumes, and the small nuts it belongs undoubtedly to *F. miliacea*.

Miquel, Fl. Ind. Bat. 3, 1856, 322, described *F. miliacea* var. *validior*, "umbellae radii primarii saepe 5, 2 majoribus bis-terve umbellato-proliferis, spiculis majusculis", based on a specimen from Sumatra, Padang, leg. *Junghuhn* (L). In this specimen I can not find any difference with typical *F. miliacea*.

Java. Central Java, Res. Semarang, Div. Grobogan, near Karangasem: *Koorders 28244 β* (BO); Kesongo, on damp brackish clay: *Kooper, 650b, p.p.* (BO).

Philippines. Luzon, Prov. of Ilocos Norte, Burgos: *Ramos BS 27232* (*type-coll., holotype* in L) (BM, BO, L, NY, P).

12. Fimbristylis aphylla Steud. in Zoll., Syst. Verz. 1854, 61, nom. nud.; Syn. Plant. Glum. 2, 1855, 114. — *F. globulosa* var. *aphylla* (Steud.) Miq., Fl. Ind. Bat. 3, 1855, 322. — *F. quinquangularis* var. *crassa* Clarke, Fl. Br. Ind. 6, 1893, 644; Camus, Fl. Gén. I. C. 7, 1912, 115. — *F. quinquangularis* (non Kunth) Koord., Exk. Fl. Java 1, 1911, 200, p.p.; Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 162, p.p.; Kük., Candollea 6, 1936, 425. — *F. salbundia* (non Kunth) Boeck., Linnaea 37, 1871, 44, quoad pl. jav.

If *F. globulosa* (Retz.) Kunth, *F. miliacea* (L.) Vahl, *F. quinquangularis* (Vahl) Kunth, *F. salbundia* (Nees) Kunth, and *F. anisoclada* Ohwi are accepted as specifically distinct, *F. aphylla* Steud. also deserves specific rank. Its relations to *F. quinquangularis* certainly are not closer than those to the other species of this intricate group. In habit it is most similar to *F. salbundia*; for the identification of both species ripe fruits are almost indispensable. The darker spikelets of *F. salbundia* angular by reason of the keeled glumes, and the (2—)3 stamens of the latter species (1—2 in *F. aphylla*) may serve as auxiliary characters. *F. aphylla* has been recorded from India and Further India; in Malaysia it seems to be

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1) Strictly speaking this inner margin is the upper side of the blade (see Chermezon, Bull. Soc. Bot. France 73, 1926, 260).

restricted to Sumatra and Java. The only specimen I have seen from the Philippines may be mislabelled.

It occurs in open wet places (swamps, rice fields) at medium altitudes (500—1500 m).

SUMATRA. N. Sumatra, Atjeh, Takengon: *Jochems 251* (L); 1200 m: *Van Steenis 5820* (BO); Gayu and Alaslands, Gayo Luas: *Van Daalen 221* (L); Karo plateau near Berastagi, wet rice-field, 1300 m: *Lörzing 6725* (BO); wet grassy place, 1250 m: *Lörzing 8436* (BO); swampy ground: *Ridley s.n.* (K); S. of Sibolangit, 650 m: *Lörzing 4245* (BO); Karolands, near Tandjung, 800 m: *Lörzing 8999* (BO); saddle Assahan, Porsea-Tutupan: *Lörzing 9935* (BO); Asahan, vicinity of Lumban Ria: *Rahmat si Boeea 7470* (GH, US), *7997* (GH); Adian Rindang, vicinity of Huta Tomuon Dolok: *Rahmat si Boeea 8733, 8757* (GH); vicinity of Aek Munte, 500 m: *Rahmat si Boeea 9117* (GH); hills ESE of Toba Lake, grassy wilderness, 1200—1400 m: *Lörzing 6643* (BO); W. Batuhuda, moist localities, 1200 m: *Lörzing 8030* (BO). Central Sumatra, Mt Talang-Laras Talang, rice-field, 1500 m: *Bünnemeijer 5186* (BO, L); roadside, 1400 m: *Bünnemeijer 5190* (BO); Mt Korinchi, 750—1400 m: *Bünnemeijer 8022, 8142* (BO), *8173* (B, BO, L, U), *Jacobson 2526* (BO), *Robinson & Kloss s.n.* (BM, K, SING); Lubu Gadang: *Matthew s.n.* (K). S. Sumatra, Benkulen, Udjung, 1000 m: *Rappard P 17a* (BO); Rambutan, 950 m: *Bünnemeijer 3425* (BO, L); Palembang, Banding Agung, 500 m: *Van Steenis 3976* (BO, L, U).

JAVA: *Goering sect. II nr 149* (*lectotype*) (P); *Reinwardt s.n.* (U). W. Java, ad frontem pr. Bantar Peteh: *Zollinger 1609* (*syntype*) (FI, G, P); in paludibus pr. Prabakti: *Zollinger 3524* (*syntype*) (BM, F, G, GH, P); Priangan: *Warburg 11162* (US); Batavia: *Didrichsen 3935* (C); Bukanagara, 1100 m: *Wisse 998* (BO); Bogor: *Hallier s.n.* (BO, L), *Raap 96* (L); Mt Salak, 1100 m: *Lam 2243, 2245* (BO); N. foot of Mt Salak, 750 m: *Kurz 330* (U); Telaga Saät, 1250 m: *Backer 24012* (BO, L); Tugu, 900 m: *Kurz 1842* (L); S of Leuwiliang, 1000 m: *Backer 25753* (BO); Nirmala, 1300 m: *Backer 10818* (BO, L, U); Pasawahan, 500 m: *Backer 25500* (BO, L); above Singaparna, 600 m: *Backer 8593* (BO, L); Tjipanas, 1000 m: *Kurz 1832* (L, P); Tjipajung: *Monod de Froideville s.n.* (BO); Megamendung: *Van Steenis 2243* (BO); Tjibodas, 1300—1400 m: *Bruggeman 619* (BO), *Van Steenis s.n.* (BO), *Kern 7682, 8149* (BO), *Sapiin 2154* (U); Takoka, 1000 m: *Koorders 14930 β* (BO); Sindanglaja: *O. Kuntze 4455* (US); Tjadasmalang, swampy places, 1000 m: *Bakhuizen v. d. Brink 2445* (BO); Wijnkoopsbaai: *Junghuhn 412* (U); Mt Patuha, swamp, 1500 m: *Van Steenis 4431* (BO, L); Bandung, 800 m: *Van Steenis 1663* (BO), *Smith & Rant s.n.* (BO). Central Java: *Horsfield 1069* (BM); Wonosobo, 700 m: *Brinkman 298* (BO); Bandungun, 1000 m: *Kooper 513b* (BO); Kedu, Temanggung, 600 m: *Lörzing 404* (BO); Muntilan, 350 m: *Van Rijckevorssel 16* (BO). E. Java, Madiun, Ngebel, 700 m: *Koorders 23295 β* (BO, L); SE. Java: *Forbes 893* (BM).

PHILIPPINES. Luzon, Bontoc Subprov. *Vanoverbergh 2162* (FI).

13. Fimbristylis quinquangularis (Vahl) Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1854, 113; Miq., Fl. Ind. Bat. 3, 1856, 321; Boeck., Linnaea 37, 1871, 42; C. B. Clarke, Fl. Br. Ind. 6, 1893, 644; Philip. J. Sc. 2, 1907, Bot. 96; Ill. Cyp. 1909, t. 43, f. 4—6; Koord., Exk. Flora Java 1, 1911, 200, p.p.; 4, 1922, f. 257 & 258; Camus, Fl. Gén. I. C. 7, 1912, 114; Merr., En. Philip. Fl. Pl. 1, 1923, 125; Back., Onkruidfl. Jav. Suikerrietgr. 1928, 162, p.p., t. 170; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 26. — *Scirpus quinquangularis* Vahl, En. 2, 1806, 279. — *F. miliacea* (non Vahl) S. T. Blake, J. Arn. Arb. 35, 1954, 216.

S. T. Blake (1954) refers the Linnean epithet *miliaceus* to *F. quinquangularis* (Vahl) Kunth, whereas to his mind *F. littoralis* Gaud. is the correct name of the species hitherto generally known as *F. miliacea*. This undesirable change of names can legally be avoided; see Kern, Taxon 3, 1954, 246.

Little attention has been given to the taxonomic value of the ligule in *Fimbristylis*. In *F. quinquangularis* and the allied species the ligule is absent as a rule; only in one of the two specimens of *Robinson 1891* in the Leiden Herbarium it is represented by a dense fringe of short hairs, like in *F. microcarya* F. v. M.

Because up to the present in Malaysian literature *F. aphylla* was not distinguished from *F. quinquangularis*, a survey of the materials examined is given.

F. quinquangularis occurs in open or lightly shaded wet places at low altitudes (0—500 m), unlike *F. aphylla* which is a plant of medium altitudes (500—1500 m).

SUMATRA. E. Coast Res., Sungei Diskin: *Jochems 3154* (BO); Belawan (Deli), coastal swamp, 0—2 m: *Lörzing 3482* (BO).

JAVA. W. Java, Banten, Bodjongmanik: *Koorders 40794 β* (BO); Bantardawa near Bandjar: *Backer s.n.* (BO); Kiara Pajung, N of Tjiandjur, swampy place, 500 m: *Backer 23945* (BO). Central Java, Cheribon, forestry Indramaju: *Van Steenis 6666* (BO); Indramaju, forestry Plosokerep: *Van Steenis 7493* (BO), *7529* (BO, L), *8171* (BO); Purwodadi, 175 m: *Coert 501* (BO, L); Semarang, rice-field: *Docters van Leeuwen s.n.* (BO); Djogjakarta, div. Kulon Progo, Dayakan, rice-field, 12 m: *Landbouwleraar Djogja 24* (BO, L). E. Java, swampy places near Alkmaar: *Mousset 495* (BO); N. Kediri, teak-culture Tunglur, 125 m: *Grutterink 3164* (BO); Pasuruan, Karangassen: *Kooper 621* (L); Karangtengat: *Kooper s.n.* (L). Kangean Arch. Paliat, teak-forest, 10 m: *Backer 29331* (BO); Sabunten, swampy place, 10 m: *Backer 29858* (BO, L).

LESSER SUNDA ISLANDS. Timor, drying up pool: *Monod de Froideville 1714* (BO).

PHILIPPINES. Coron Island: *Ramos BS 41141* (P). Luzon, Prov. of Bulacan: *Ramos Phil. Pl. 1423* (BM, BO, G, GH, L, NY, P, SING); Manila: *Merrill BS 9808* (BM, K, P, NY, US); Luzon Central: *Loher 1340* (K); Prov. of Rizal: *Reillo BS 19300* (L, NY); Pangasinan Prov.: *Ramos BS 4853* (NY, P, US), *BS 4935* (P, SING, US). Samar, Matuguiano: *Edaño PNH 15619* (BM, L), *Gachalian PNH 15476* (L, SING); Mt Purog: *Edaño PNH 15397* (SING). Leyte, SW of Tacloban: *Glassman 521* (GH). Bohol: *Ramos BS 42927* (G, SING). Panay: *Copeland 100 p.p.* (K, US). Mindanao, Davao: *Copeland 586* (G, K p.p.; in BO, K p.p. & NY = *F. miliacea*).

CELEBES. SE. Peninsula, Kandari, Lepo-lepo: *Beccari s.n.* (FI 12026); E. Celebes, Sukon, rice-fields: *Kaudern 412* (L).

MOLUCCAS. Buru: *Lahaie 1564* (P). Amboina: *Robinson 1894* (BM, BO, GH, L, SING, US).

NEW GUINEA. W. New Guinea, S of Merauke, coastal swamp, 5 m: *Van Royen 4574* (L). Papua, Baroko, Mekeo Distr., Centr. Div., common, damp savannah flats, 30 m: *Brass 3733* (BO, GH, L, NY).

14. Fimbristylis salbundia (Nees) Kunth, En. Plant. 2, 1837, 230; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 44, p.p., haud quoad pl. jav.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 646; J. Linn. Soc. 34, 1898, 69; S. T. Blake, J. Arn. Arb. 35, 1954, 216. — *Trichelostylis salbundia* Nees in Wight, Contr. Bot. Ind. 1834, 105. — *F. paludosa* Merr., Philip. J. Sc. 9, 1914, Bot. 265; En. Philip. Fl. Pl. 1, 1923, 125. — *F. globulosa* (non Kunth) Ohwi, Bot. Mag. Tokyo 56, 1942, 202, non al.

Nees based his *Trichostylis salbundia* on *Wallich 3199* and *3526*; the latter collection he also cited under *Trichelostylis complanata* (Retz.) Nees. Clarke (1893, 1898) pointed out the great confusion in these Wallich collections and based his conception of *F. salbundia* on *3526* of the Wallich Herbarium at Kew, which specimen I therefore propose to accept as the lectotype of the species.

F. salbundia, only reported from New Guinea by Blake (1954), appears to be rather widely distributed in Malaysia; *F. paludosa* Merr. is a synonym.

SUMATRA. Karo Plateau, Lau Bedimbo, E of Siosar, swamps, 1250 m: *Lörzing 8534* (BO); Mt Piso-Piso, NW of Toba Lake, moist grassland, 1400 m: *Lörzing 9370* (BO); Huta Gindjang, Toba: *Ruttner 128* (BO); Tapanuli, Dolok Margu, swinging bog, 1400 m: *Polak 90* (BO); Mt Korinchi, Sungei Kumbang, 1350 m: *Robinson & Kloss 118* (BM, SING, US).

PHILIPPINES. Luzon, Benguet Subprov.: *Merrill Phil. Pl. 551* (FI, G, U); *Williams 1239* (*type* of *F. paludosa* Merr.) (GH, K, NY, US); Baguio: *Elmer 6497* (BO, K, NY, P, US), *Clemens 51891* (GH, US).

CELEBES. Res. Menado, E of Lake Lindu, W. slope of Mt Ngilalaki, swamp, 1000 m: *Bloembergen 4099* (BO, L); Bolaang Mongondow, Danau Lake: *Kaudern 147* (L).

NEW GUINEA. W. New Guinea, Angi, Arfak Mts, in open marsh by Lake Giji, 1900 m: *Kanehira & Hatusima 13683* (BO). Papua, Centr. Div., Urunu, Vanapa Valley, small swamps, 1900 m: *Brass 4805* (BO, GH, K, L, US).

15. **Fimbristylis anisoclada** Ohwi, Blumea 8¹, 1955, 97 — *Fig. 2.*

The specimen on which this species is based (*Noerkas 218* from S. Celebes) lacks the basal parts. Van Steenis collected more complete material in Central Java. In the Paris Herbarium I found some specimens with well developed sterile shoots from Indo China. *F. anisoclada* is a perennial plant, with tufted stems up to 80 cm tall and about 2 mm thick, at the base clothed with 1—3 bladeless or almost bladeless, tubular, up to 20 cm long sheaths with a lanceolate appendage 2—3 cm long. The leaves of the sterile shoots are much shorter than the stems, erect, rigid, abruptly acuminate, smooth or very slightly scaberulous on the margins near the apex, 1—2 mm wide. In the Indochinese specimens the inflorescence is smaller than in the Malaysian ones, 5—9 cm long. The decision whether *F. anisoclada* and *F. salbundia* can be kept apart, must be postponed until more material is available.

COCHIN CHINA: *Godefroy s.n. in 1875* (P); prairies inondées près Saïgon: *Godefroy s.n. in 1874* (P).

JAVA. Central Java, Indramayu, forestry Plosokerep, 25 m: *Van Steenis 8198* (BO, L).

16. **Fimbristylis recta** F. M. Bail., 3rd Suppl. Syn. Queensl. Fl. 1890, 80; S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 44; J. Arn. Arb. 35, 1954, 211. — *F. macgillivrayi* C. B. Clarke, Kew Bull. Add. Ser. 8, 1908, 24.

S. T. Blake (1947) supposed the identity of *F. macgillivrayi* C. B. Clarke with *F. recta* F. M. Bail. I had the opportunity to study the type of *F. macgillivrayi* in the British Museum and a duplicate of it in the Paris Herbarium (Lizard Island, N. Coast of Australia, *MacGillivray 35*). There can be no doubt that the two are conspecific, so that *F. macgillivrayi* has accordingly been referred to the synonymy of *F. recta*. The style in *MacGillivray 35* is glabrous, not villous as Clarke indicated.

17. **Fimbristylis hispidula** (Vahl) Kunth, En. Plant. 2, 1837, 227; Boeck., Linnaea 37, 1871, 27. — *Scirpus hispidulus* Vahl, En. Plant. 2, 1806, 276. — *Isolepis exilis* Kunth in H. B. K., Nov. Gen. 1, 1815, 224. — *F. exilis* (Kunth) R. et S., Syst. Veg. 2, 1817, 98; C. B. Clarke, Fl. Trop. Afr. 8, 1902, 418; Nelmes & Baldwin, Am. J. Bot. 39, 1952, 377, f. 49—57. — *Abildgaardia pubescens* Presl, Rel. Haenk. 1, 1828, 180, non *F. pubescens* Link. — *F. preslii* Kunth, En. Plant. 2, 1837, 228; Steud., Syn. Plant. Glum.

2, 1855, 108; F.-Vill., Nov. App. 1882, 308; Merr., En. Philip. Fl. Pl. 1, 1923, 127. — *F. clavinux* C. B. Clarke, Ill. Cyp. 1909, t. 41, f. 1—3.

The two collections cited below show some differences. In the specimens from Wetar, perfectly agreeing with the African specimens of *F. hispidula* in the Leiden Herbarium, the inflorescence is anthelate, consisting of 3—5 spikelets and subtended by small foliaceous bracts, the glumes are 3 mm long, the style is glabrous and about $1^1/_4$ mm long. The inflorescence of the Luzon specimens, however, usually consists of a single terminal spikelet, sometimes with 1—2 lateral additional ones, the glumes are 4 mm long, the style is slightly pubescent and 2 mm long. Undoubtedly the latter specimens represent Presl's *Abildgaardia pubescens*, the type-collection of which Presl localized "in Mexico et in Luzon" and Merrill (1923) supposed to be probably not Philippine.

F. hispidula is highly polymorphic, and forms with only 1 or 2 spikelets occur also in Africa. *F. hispidula* var. *submonostachya* Boeck., Linnaea 37, 1871, 28 was based on *Scirpus hispidulus* Vahl (Guinea, leg. *Thonning*) and *Abildgaardia pubescens*; *F. exilis* var. *oligostachya* C. B. Clarke, Fl. Trop. Afr. 8, 1902, 419 on specimens from Nile Land. Therefore I prefer to treat *F. hispidula* and *F. preslii* as being conspecific.

LESSER SUNDA ISLANDS. Wetar, near Tihu Lake, *Eucalyptus* forest and swamp, 425—500 m: *Elbert 4553* (L).

PHILIPPINES. Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32797* (BM, BO, K, L, NY, P, SING, US).

18. Fimbristylis furva R. Br., Prodr. 1810, 228; S. T. Blake, J. Arn. Arb. 35, 1954, 219.

Recorded by Blake from Papua. It has been also collected in the Aru Islands and the southern part of Dutch New Guinea.

W. NEW GUINEA. NE. of Kurik bivouac (NW of Merauke), in grassland among moderately tall grasses, 6 m: *Van Royen 4880, 4881* (L). Aru Islands, P. Trangan, Kp. Ngaibos, savannah in hilly country, few m: *Buwalda 5356a* (BO, L).

19. Fimbristylis lanceolata C. B. Clarke, Kew. Bull. Add. Ser. 8, 1908, 25. — Descr. emend. — Sect. *Leptocladae* Ohwi. — Perennis, rhizomate brevissimo. *Culmi* fasciculati, valde compressi, ad basin incrassati, striati, glabri vel praesertim apicem versus sparse pilosi, laeves, (10—)20—40 cm alti, $^3/_4$—$1^1/_4$ mm lati, ad basin vaginis 1—2 tubulosis sine laminis apice oblique fissis superne puberulis vel margine membranaceo ciliatis cincti. *Folia* basalia culmo breviora, erecta, rigidiuscula, plana, ad apicem obtusa vel abrupte acuminata, eligulata (basi laminae intus sensim in vaginam transeunte), glabra, $1^1/_2$—3 mm lata, marginibus incrassatis sursum antrorse scaberulis; vaginae inferiores ferrugineae vel brunneae, striatae, marginibus membranaceis. *Anthela* simplex vel subcomposita, subcontracta, 2—9-spiculata, 2—4 cm longa, 2—7 cm lata. Bracteae involucrales 2—3, brevissimae, squamiformes, cuspidatae, 1—5 mm longae. Anthelae radii 1—5, denique patentes vel arcuate reflexi, compressi, laeves, $^1/_2$—2 cm longi; radioli si adsunt brevissimi, c. $^1/_2$ cm longi. *Spiculae* solitariae, oblongae vel lineares, teretes, acutiusculae, laxe pluriflorae, 10—25 mm longae, 2 mm latae. Rhachilla alata. *Glumae* spiraliter dispositae, tenuiter membranaceae, adpressae, oblongo-ovatae, obtusissimae, apice inciso, paullo infra apicem mucronulatae, vix carinatae, 3—5-nerviae (nervo medio prominente, nervis lateralibus obscuris), fulvae vel fuscae, 4—4$^1/_2$ mm longae, 2$^1/_2$—2$^3/_4$ mm latae, dimidio superiore dense glanduloso-puncticulato, marginibus in parte superiore majore longe ciliatis. *Stamina* 3; antherae lineares, 2—2$^1/_2$ mm longae, connectivo in appendicem ovato-oblongam setis conspicuis cristatam producto. *Stylus* tenuis, triqueter, basi pyramidato-incrassato hispidulus, caetero glaber, 3—3$^3/_4$ mm longus; stigmata 3, stylo multo breviora. *Nux* obtuse trigona, late obovata, breviter stipitata, haud vel vix umbonulata, dense verruculosa, primo alba denique nigricans, 0.9 mm longa, 0.7—0.8 mm lata, cellulis extimis longitudinaliter ellipticis vel oblongis.

The type specimen in the Paris Herbarium was marked by Clarke in 1888 "*Fimbristylis lanceolata,* sp. nov. This is the type of the new species." The publication was only done posthumously. The original description being very inadequate, I have drawn up the above emended description after the material cited below, thusfar the only collections known to me.

Clarke placed the species in the affinity of *F. merguensis* C. B. Clarke, with which it has nothing to do in my opinion. Its true place is near *F. furva* R. Br. and *F. macassarensis* Steud. It is remarkable for the elongate spikelets and the strongly compressed, almost ancipitous stems.

AUSTRALIA. Baie Rafles—Côte Nord de la Nouvelle Hollande, Voyage de l'Astrolabe et de la Zélée 1838—1840: *Le Guillou s.n. (type)* (P).

SE. CELEBES. Rumbia, Wambakowu, in monsoon forest, moist locality, alt. 40—130 m: *Elbert 3091* (L).

MOLUCCAS. Aru Islands, P. Trangan, Kampong Meroor, savannah, alt. few m: *Buwalda 5532* (BO, K, L, SING).

20. Fimbristylis macassarensis Steud., Syn. Plant. Glum. 2, 1855, 109; Miq., Fl. Ind. Bat. 3, 1856, 318. — *F. tenera* (non Schult.) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 95; Merr., En. Philip. Fl. Pl. 1, 1923, 126. — *F. corniculata* Merr., Philip. J. Sc. 7, 1912, Bot. 231; En. Philip. Fl. Pl. 1, 1923, 122.

Steudel based this species on "*Zollinger 1019*" (should be *1059*) from Celebes, of which collection I have only seen a specimen in the Paris Herbarium, determined by Steudel. Not before 1921 *F. macassarensis* was collected for the second time in Celebes by Bünnemeijer. His specimens perfectly agree with the type, except for the nuts densely verruculose in *Zollinger 1059*, smooth in *Bünnemeijer 10837*. In the Madura collection cited below, consisting of a few fruiting stems only, the nuts are verruculose.

In *Merrill 7359,* the type collection of *F. corniculata,* the leaves and spikelets are narrower, the anthers shorter, the style shorter and slightly fimbriate, and the (verruculose) nuts somewhat smaller. However, the Celebes plants and the Philippine ones are so nearly related that, at least provisionally, I prefer to treat them as geographical races of the same species. For a decision much more material is needed.

Merrill supposed *F. corniculata* to be allied to *F. tenera* Schult., to which species *Loher 760* (identical with *Merrill 7359*) was referred by Clarke in 1907. The bladeless cauline leaves, the long-ciliate glumes notched at the apex, the bristly connective, the style hispidulous at the base, and the bluish black nuts with longitudinally elliptic to oblong outer cells, unmistakably point, however, to the close affinity with *F. lanceolata* C. B. Clarke and *F. furva* R. Br.

MADURA. Regency Pamekasan, distr. Bunder, Tambhung, experimental field: *Adj. Landbouwcons. Pamekasan 2a, p.p.* (BO).

PHILIPPINES. Luzon, La Loma near Manila, in open grassland, 10 m: *Merrill BS 7359* (*type coll.* of *F. corniculata* Merr.) (BM, K, L, P, US); Luzon central: *Loher 760* (K).

CELEBES. SW. Celebes, near Makassar: *Zollinger 1059 (type coll.)* (P); Mt Galesang near Malino, roadside, 310 m: *Bünnemeijer 10837* (BO, L).

21. Fimbristylis cinnamometorum (Vahl) Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 35; Kük., Mitt. Thür. Bot. Ver., N. F. 50, 1943, 9; S. T. Blake, J. Arn. Arb. 35, 1954, 220. — *Scirpus cinnamometorum* Vahl, En. Plant. 2, 1806, 278. — *F. cyperoides* R. Br., Prodr. 1810, 228; Kunth, En. Plant. 2, 1837, 244; C. B. Clarke, Fl. Br. Ind. 6, 1893, 650, Ill. Cyp. 1909, t. 44, f. 11—13; Benth., Fl. Austral. 7, 1878, 317. — *F. kamphoeveneri* Boeck., Bot. Jahrb. 5, 1884, 505.

Comparison of the type of *F. cyperoides* R. Br. in the British Museum with an isotype of *Scirpus cinnamometorum* Vahl in the Leiden Herbarium showed that they are conspecific, proving that Blake (1954) is right in treating them as synonymous. Clarke (1893, 649) referred *F. kamphoeveneri* Boeck. to *F. fusca* (Nees) C. B. Clarke. Obviously this was done on account of *Kamphoevener 2184*, cited by Clarke (J. Linn. Soc. 34, 1898, 72) under *F. fusca*. The type of *F. kamphoeveneri* is *Kamphoevener 2485* (KIEL), which I have not seen. However, a specimen of *Kamphoevener 2484* in the Copenhagen Herbarium (like *2485* from Teressa) undoubtedly belongs to *F. cinnamometorum*. It was annotated by Boeckeler as follows: "*Fimbristylis (Trichelost.) Kamphoeveneri* Böckl. in Engl. Bot. Jahrb. B. V H. 5, zu Herb. Kiliensi sub no 2485." From Boeckeler's description it is just as well clear, that *F. kamphoeveneri* does not belong to *F. fusca*: "foliis filiformi-setaceis .... spiculis perangustis .... squamis tenui-membranaceis granulis minutis ferrugineis conspersis .... car. cancellata."

A survey of the New Guinea collections of *F. cinnamometorum* was given by Kükenthal (1943) and Blake (1954). The species occurs also in Sumatra and the Philippines.

SUMATRA. E. Coast Res., Si Mandi Angin, on the Sungei Kanan: *Rahmat si Boeea 4081* (NY, US).

PHILIPPINES. Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32809* (BM, BO, GH, K, L, P, SING).

NEW GUINEA. W. New Guinea, Cyclop Mts: *Meijer Drees 88* (BO, L). Papua, see Blake (1954).

22. Fimbristylis adenolepis Kern, spec. nov. — Sect. *Fuscae* Ohwi — *Fig. 3.*

Herba annua, gracilis, glabra, radicibus fibrosis. *Culmi* fasciculati, erecti, setacei, angulato-costati, laeves, 5—12 cm alti, $^{1}/_{4}$—$^{1}/_{3}$ mm crassi, ad basin foliati. *Folia* culmo 2—3-plo breviora, erecta, setacea, plana, obtusiuscula vel abrupte acuminata, laevia, supra celluloso-reticulata subtus nervosa, eligulata, usque ad 6 cm longa, c. $^{1}/_{2}$ mm lata, marginibus incrassatis; vaginae herbaceae, striatae, stramineae, marginibus membranaceis. *Anthela* simplex vel subcomposita, laxa, (1–)3—5-spiculata, usque ad 2 cm longa et lata. Bracteae involucrales 2—3, foliis consimiles, erectae, inflorescentia breviores, ima $^{1}/_{2}$—1 cm longa. Radii anthelae 1—3, filiformes, erecto-patentes, obtusanguli, compressi, laeves, usque ad 12 mm

longi. *Spiculae* solitariae, lanceolatae, valde compressae, acutiusculae, pauci- vel pluriflorae, 3—5 mm longae, 1 mm latae. Rhachilla anguste alata. *Glumae* distiche dispositae, tenuiter membranaceae, erectae, elliptico-ovatae, obtusiusculae, muticae, acute carinatae (carina 3-nervia, nervo medio infra apicem evanescente), ferrugineae (marginibus dilutioribus), dense glanduloso-puncticulatae, $1^1/_2$—2 mm longae, 1 mm latae; inferiores 2 vacuae,

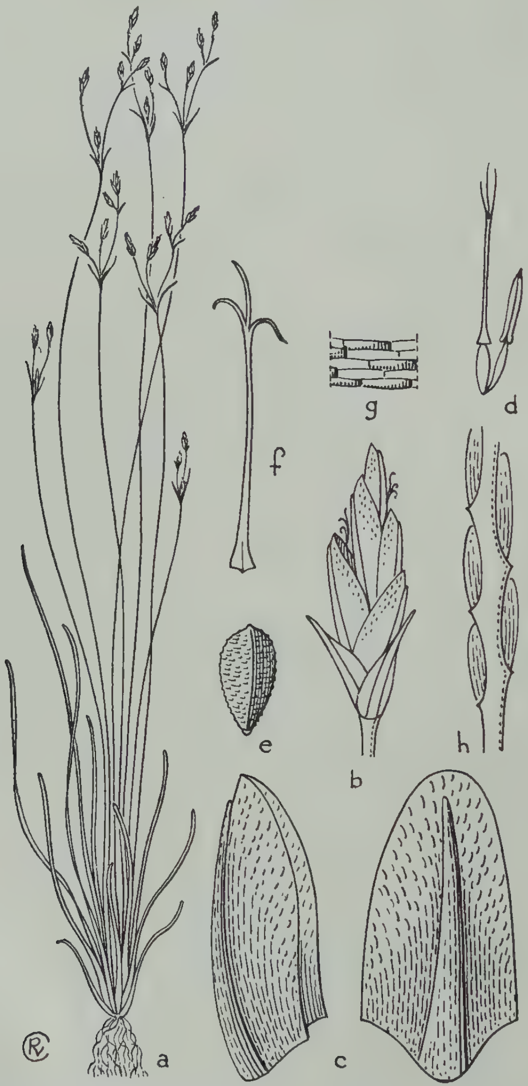

Fig. 3. *Fimbristylis adenolepis* Kern — a. Habit, × 1; b. spikelet, × 10; c. glumes, × 20; d. young flower, × 20; e. nut, × 20; f. style and stigmas, × 20; g. outer cells of nut; h. rhachilla, × 20. — From *Backer 27049* (BO).

breviores, breviter cuspidatae. *Stamen* 1; anthera oblonga, 0.4—0.5 mm longa, connectivo in appendicem brevem rubram laevem producto. *Stylus* triqueter, basin versus pyramidato-incrassatus, glaber, 1—$1^{1}/_{4}$ mm longus; stigmata 3, stylo multo breviora. *Nux* obtuse trigona, oblongo-obovata, breviter stipitata, humiliter umbonulata, verruculosa, cellulis extimis transverse oblongo-linearibus lineolata, straminea, 0.6—0.75 mm longa, 0.25—0.3 mm lata.

On account of the transversely oblong-linear external cells of the nut, and the gland-dotted glumes, apparently related to *F. cinnamometorum* (Vahl) Kunth. The latter species, however, is a much larger, rhizomatous perennial, with horny lower leaf-sheaths, glumes $2^{3}/_{4}$—4 mm long and $1^{1}/_{2}$—2 mm wide, 3 stamens, linear anthers 1—2 mm long, a much longer style (3—$3^{1}/_{2}$ mm), and more obovate somewhat larger nuts 0.75—0.9 by 0.4—0.7 mm.

INDO CHINA. Annam, Nha-trang and vicinity, March 11—26, 1911, *C. B. Robinson 1071* (P). Cochin China. Bay Doc, bords de la mer, Sept. 23, 1875, *Godefroy 815* (P).

SIAM. Surat, Khun Tale Lake, Jan. 13, 1935, *Gunnar Seidenfaden 2326* (SING).

MALAYSIA. Kangean Archipelago, Kangean Island, Ardjasa, moist grassy field, abundant, 25 m, March 16, 1919; *Backer 27049* [partly, mixed up with *F. fimbristyloides* (F. v. M.) Druce and *F. obtusata* (Clarke) Ridl.] (BO, *type*; L).

23. Fimbristylis fuscoides C. B. Clarke in Ostenf., Bull. Herb. Boiss. 2, 1905, 719; Kew Bull. Add. Ser. 8, 1908, 25; Camus, Fl. Gén. I. C. 7, 1912, 124; Ridl., Fl. Mal. Pen. 5, 1925, 160. — *F. angustifolia* Ridl., J. R. As. Soc. Str. Br. 59, 1911, 223. — *F. erythradenia* Camus, Not. Syst. 1, 1910, 247; Fl. Gén. I. C. 7, 1912, 113.

I have seen specimens from Siam (Pattani: *Kerr 7738*) (SING), Indo China, and Malaysia; the Malaysian ones are enumerated below. The species is characteristic for sandy fields and sandy places on heaths at low altitudes. The type of *F. erythradenia* Camus from Cochin China: *Thorel 506* (P) agrees with the specimens of *F. fuscoides* examined.

MALAY PENINSULA. Setul, sandy places on heaths: *Ridley 14822* (*type-coll.* of *F. angustifolia* Ridl.) (BM, K, SING); Perlis, Bukit Ketri heath: *Henderson 22960* (SING).

BILLITON: *Riedel s.n.* (FI, L); N of Manggar: *Ham 2* (BO); Begandung, roadside: *Vorderman s.n.* (BO, L).

BORNEO. Labuan: *Barber 356* (*lectotype* of *F. fuscoides* C. B. Clarke) (K), *Beccari s.n.* (FI, sheet nr 12024), *Bp. Hose 95* (SING), *Ridley 9042* (K, SING).

24. Fimbristylis fusca (Nees) C. B. Clarke, Fl. Br. Ind. 6, 1893, 649; Philip. J. Sc. 2, 1907, Bot. 98; Ridl., Mat. Fl. Mal. Pen. 3, 1907, 97 p.p.; Koord., Exk. Fl. Java 1, 1911, 200; 4, 1922, f. 262; Camus, Fl. Gén. I. C. 7, 1912, 123; Merr., En. Philip. Fl. Pl. 1, 1923, 123 p.p.; Ridl., Fl. Mal. Pen. 5, 1925, 160, p.p.; Backer, Bekn. Fl. Java 10, 1949, fam. 246, 18; S. T. Blake, J. Arn. Arb. 35, 1954, 211. — *Gussonea cyperoides* Presl, Rel. Haenk. 1, 1828, 183, t. 33, non *F. cyperoides* R. Br. — *Gussonea pauciflora* Brongn. in Duperr., Voy. Bot. 2, 1829, 171, t. 33, non *F. pauciflora* R. Br. — *Abildgaardia fusca* Nees in Wight, Contr. Bot. Ind. 1834, 95; Kunth, En. Plant. 2, 1837, 249; Steud., Syn. Plant. Glum. 2, 1855, 72; Boeck., Linnaea 37, 1871, 54. — *Abildgaardia cyperoides* (Presl) Nees in Wight, Contr. Bot. Ind. 1834, 95, in adnot.; Kunth, En. Plant. 2, 1837, 249.

— *Abildgaardia pauciflora* (Brongn.) Kunth, En. Plant. 2, 1837, 249; Steud., Syn. Plant. Glum. 2, 1855, 73; Miq., Fl. Ind. Bat. 3, 1856, 298. — *Rhynchospora ? anomala* Steud. in Zoll., Syst. Verz. 1, 1854, 61, nom. nud.; Syn. Plant. Glum. 2, 1855, 149; Miq., Fl. Ind. Bat. 3, 1856, 337. — *Isolepis longispica* Steud., Syn. Plant. Glum. 2, 1855, 104. — *F. subfusca* Camus, Not. Syst. 1, 1910, 248; Fl. Gén. I. C. 7, 1912, 123. — *F. rigidifolia* Ridl., J. Str. Br. R. As. Soc. 59, 1911, 223; Fl. Mal. Pen. 5, 1925, 159. — *F. stenochlaena* Kük., Mitt. Thür. Bot. Ver., N. F. 50, 1943, 11; S. T. Blake, J. Arn. Arb. 35, 1954, 220.

A highly variable species. *F. stenochlaena* Kük. was based on *Brass 7840* from Papua. The specimens of this collection are more robust than is usually the case in *F. fusca*. In habit they are very similar to *F. eragrostis*, from which species they differ by the hairy glumes, and the much longer style with relatively short stigmas. Kükenthal distinguishes *F. stenochlaena* from *F. fusca* by the broader leaves (2 mm) with light-coloured sheaths, the twice as long spikelets, the regularly distichous, long-acuminate, narrower glumes, and the many-flowered spikelets with all flowers bisexual. Blake (1954, p. 223) characterizes *F. stenochlaena* by the 4—5 (not 3—4) mm long glumes, the 4 (not about 3) mm long style, the many-ribbed stems, the $1^{1}/_{2}$—4 mm wide leaves, and the spikelets 2—3 (not $1^{1}/_{2}$—2) mm wide. I am unable to find any difference in the glumes and nuts. The width of the leaves and the number of florets varies greatly in *F. fusca*, like in most *Fimbristylis* species. In the type collection of *F. fusca (Wallich 3530)* the glumes are $4^{1}/_{2}$—$5^{1}/_{4}$ mm long and about 2 mm wide, the style 5 mm long. The flowers of *F. stenochlaena* are triandrous (like in *F. fusca*), not diandrous as Kükenthal indicates. A gradual series of forms intergrading between *F. fusca* and *F. stenochlaena* was recently collected in Dutch New Guinea by Van Royen. Like *F. stenochlaena*, *F. subfusca* Camus and *F. rigidifolia* Ridl. are in my opinion broad-leaved *F. fusca*, the floral characters being quite those of the last species.

NEPAL: *Wallich 3530* (*type-coll.* of *Abildgaardia fusca* Nees) (L, P).

INDO CHINA. Cochin China: *Pierre s.n.* (*type* of *F. subfusca* Camus) (P).

SUMATRA. Atjeh, Isaq, grassfields in *Pinus* forest, 1000—1300 m: *Van Steenis 6248* (BO, L). E. Coast Res., near Hopoan, Toba Lake, 1250 m: *Lörzing 10132* (BO, L). W. Coast Res., Fort van der Capellen: *Matthew s.n.* (K).

MALAY PENINSULA. Setul, heaths: *Ridley 14877* (*type* of *F. rigidifolia* Ridl.) (K, SING). Singapore, Holland Road, sandy fields: *Ridley 11377* (BM, K, SING).

JAVA. W. Java, Tjikoya: *Zollinger 700* (*type-coll.* of *Rhynchospora ? anomala* Steud.) (BM, FI, G, K, L, P); Tendjo, dry grassfield, 80 m: *Backer 24022* (BO); Tjiteras, grassfield, 40 m: *Backer 26503* (B, BO, K, L); forest-reserve Maribaja, N of Djasinga, grassfields and brushwood, 50 m: *Van Steenis 11805* (BO, L); Djagabaja, grassy hills, 125 m: *Beumée A 597* (BO); Banten, Genteng Lebak: *Forbes 19* (BM); Indramayu, forestry Plosokerep, 30 m: *Van Steenis 7485* (BO, L).

BORNEO: *Barber 307* (K); Bandjermasin: *Motley 621* (K).

PHILIPPINES. Palawan, Taytay: *Merrill 9389* (BM, BO, GH, K, L, NY, P, SING). Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32742* (BO, L, NY, SING); Cagayan Prov.: *Ramos BS 7859* (NY, US); Prov. of Rizal, Bosoboso: *Merrill 2785* (BM, BO, K, NY); Luzon central: *Loher 1343* (K, US).

CELEBES. Swampy grassfield near S. Karadjae, NNE of Rapang, 75 m: *Eyma 353* (BO, U), *354* (BO); Kolonedale, between Tomata and Kamba, in open vegetation especially in dry gravel hills: *Eyma 4007* (BO, L, U).

MOLUCCAS. Ambon: *Barclay s.n.* (BM).

NEW GUINEA. W. New Guinea, grassfields E of aerodrome Andjai, 540 m: *Van Royen 3945, 3963, 5034* (L); Balim R., common among the grass on long-deforested slopes, 1600 m: *Brass 11744* (GH); Kurik bivouac, NW of Merauke, among low grasses, 6 m: *Van Royen 4887* (L). Papua, W. div., Lake Daviumbu, Middle Fly R., wet grass plains: *Brass 7840* (*type-coll.* of *F. stenochlaena* Kük.) (BM, BO, GH, K, U).

Sine loco: *d'Urville s.n.* (*type* of *Isolepis longispica* Steud.) (P).

25. **Fimbristylis fulvescens** Thwaites, En. Pl. Zeyl. 1864, 434; C. B. Clarke, Fl. Br. Ind. 6, 1893, 650; J. Linn. Soc., Bot. 34, 1898, 72; Hook. f. in Trimen, Handb. Fl. Ceylon 5, 1900, 62. — *Abildgaardia fulvescens* Thwaites. En. Pl. Zeyl. 1864, 347. — *F. fusca* var. *longifolia* Boeck., Linnaea 37, 1871, 55. — *F. fusca* (non C. B. Clarke) Ridl., Mat. Fl. Mal. Pen. 3, 1907, 97, p.p.; Fl. Mal. Pen. 5, 1925, 160, p.p.

This species was based on *Thwaites CP 679*, of which I have seen specimens in the Kew, Leiden, and Paris Herbarium, unfortunately all without ripe fruits. Of the specimens cited below *Kunstler 1690* was referred to *F. fusca* by Clarke, as was *Curtis 2175* by Ridley. However, both collections perfectly agree with *F. fulvescens*, which species may be distinguished by its annual habit, the longer more gradually acuminate leaves, and the very small anthela $1^1/_2$—2 cm long and 2—4 cm wide, with 2—5 rays each bearing only 1 spikelet (very rarely one of the rays with a very short secondary raylet). *Curtis 2175* bears mature nuts, which are oblong-obovate, sparsely verruculose, 1.25 mm long. In *F. fusca* the nuts are obovate, densely verruculose, at most 1 mm long. Whether the shape and size of the nut are reliable characters to distinguish between the two species, can only be decided when more mature material is available.

Boeckeler and Clarke attached much value to the pale colour of leaves and spikelets in *F. fulvescens*. The specimens of *CP 679* examined showed that at least the colour of the spikelets is very variable.

MALAY PENINSULA. P. Penang, Government Hill, 750 m: *Curtis 2175* (SING); same locality, shady soil, 600—750 m: *Kunstler 1690* (FI).

26. **Fimbristylis vanoverberghii** Kük. in Engl., Pflanzenr. Heft 101, 1936, 631. — *Cladium cyperoides* Merr., Philip. J. Sc. 7, 1912, Bot. 74, non *F. cyperoides* R. Br. — *Mariscus fallax* Fernald, Rhodora 25, 1923, 53 non Chermez. (1919). — *F. fusca* (non C. B. Clarke) Merr., En. Philip. Fl. Pl. 1, 1923, 123, p.p. — *F. nigrobrunnea* (non Thwaites) Kük. in Fedde, Rep. 51, 1942, 192. — *F. fusca* var. *hispidissima* Kük., Mitt. Thür. Bot. Ver. N. F. 50, 1943, 11. — *Fig. 4*.

This is a true *Fimbristylis*, although it was originally placed in *Cladium* by Merrill, and referred to *Mariscus* Zinn. (= *Cladium* Crantz) by Fernald. It is related to *F. fusca* (Nees) C. B. Clarke, but readily distinguishable by the coriaceous, shining purplish basal leaf-sheaths, the very narrow leaf-blades with subulate apex, the shorter, more or les glabrescent glumes, and the shorter, much less slender style. Up to the present it was only known from the type-collection (*Vanoverbergh 273*) from Luzon.

SUMATRA. Mid-Habinsaran, between Sibosar and Parso, grasswilderness, 1100 m: *Lörzing 7782* (BO, L); between Mt Piso-piso and Toba Lake, near Tongging, grass-wilderness, 1300 m: *Lörzing 8102* (BO); W. Batuhuda, hilly country, moist grassland, 1200 m: *Lörzing 8026* (BO).

PHILIPPINES. Luzon, Bontoc Subprov., Bauco, hillsides 1320 m: *Vanoverbergh 273 (type-collection)* (K), *s.n.* (US).

NEW GUINEA. W. New Guinea, Kebar, grassy plain S of aerodrome Andjai,

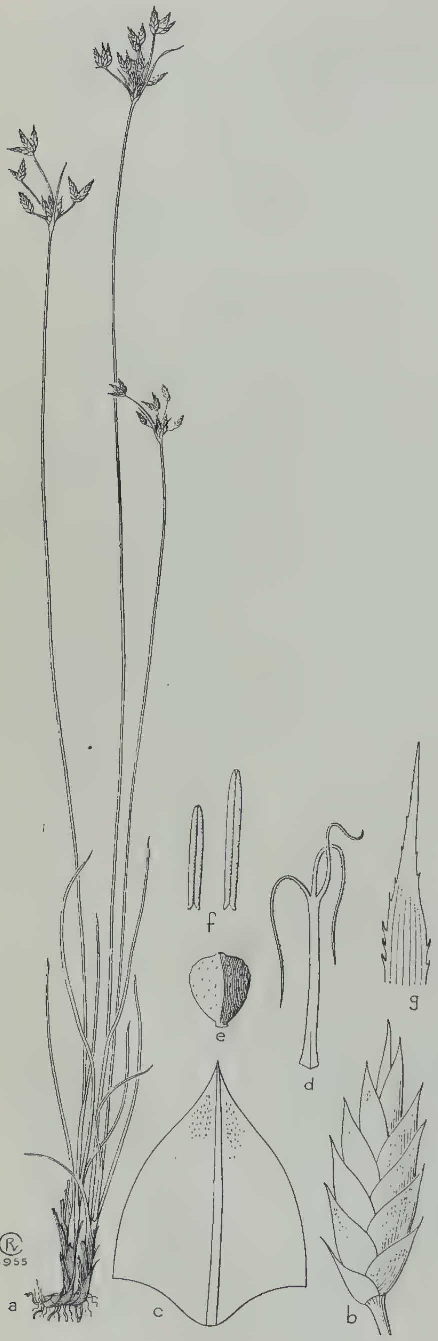

Fig. 4

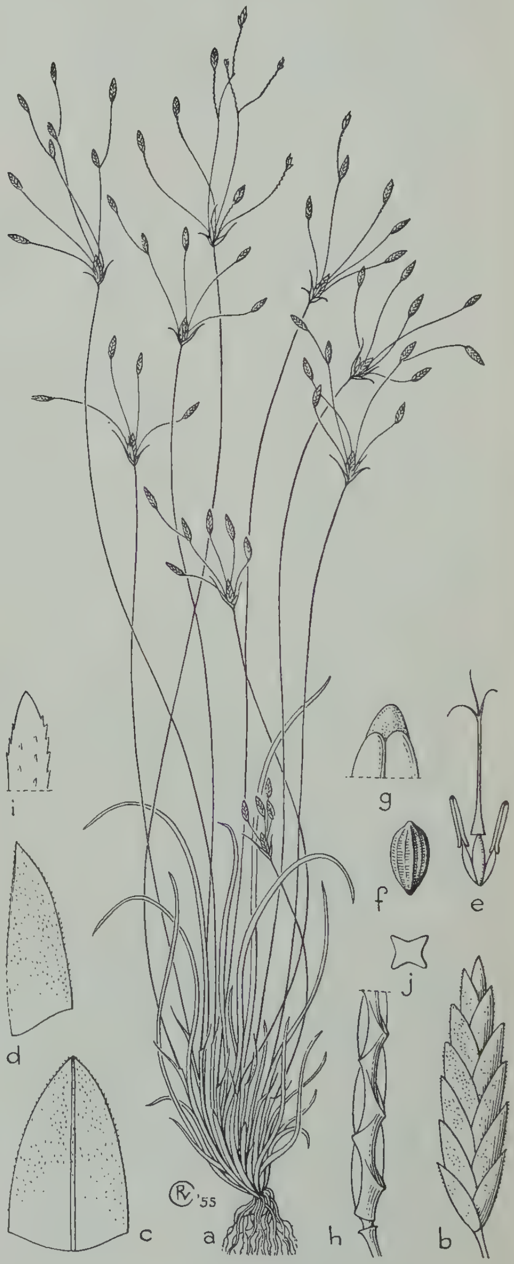

Fig. 5

540 m: *Van Royen 4972* (L) (very young). NE. New Guinea, Morobe Distr., Sattelberg, grassy hills by aerodrome: *Clemens 8286 A* (*type-coll.* of *F. fusca* var. *hispidissima* Kük.) (GH).

27. Fimbristylis calcicola Kern, spec. nov. — Sect. *Fuscae* Ohwi — *Fig. 5.*

Annua, radicibus fibrosis, glumis exceptis glabra, pallide viridis. *Culmi* dense fasciculati, erecti, pergraciles, acute quadrangulares, sulcati, laeves, 10—20 cm alti, $^{1}/_{4}$—$^{1}/_{3}$ mm crassi, ad basin vaginis 1—2 tubulosis laminis brevibus praeditis $^{1}/_{2}$—$2^{1}/_{2}$ cm longis cincti. *Foliorum laminae* culmo $^{1}/_{3}$—$^{1}/_{2}$ breviores, rigidiusculae, falcatae, planae, anguste lineares, supra celluloso-reticulatae, subtus tenuiter nervatae, acutae vel subacutae, eligulatae, $^{1}/_{2}$—1 mm latae; vaginae stramineae vel brunneae, opacae. *Anthela* simplex vel subcomposita, laxa, 3—9-spiculata, $1^{1}/_{2}$—4 cm longa. Bracteae involucrales 3—4, oblique erectae, setaceae, ad apicem magis minusve recurvatae, ad basin dilatatam scariosae, ima $^{1}/_{2}$—1 cm longa. Anthelae radii 2—5, capillares, oblique patentes, saepe curvati, angulares, compressi, laeves, 1—$2^{1}/_{2}$ cm longi. *Spiculae* solitariae, lanceolatae, oblongo-lanceolatae vel fere lineares, valde compressae, acutae, dense pluriflorae, 3—7 (denique usque ad 12) mm longae, 1—$1^{1}/_{4}$ mm latae. Rhachilla anguste alata. *Glumae* exacte distichae, membranaceae, oblique erectae, ovatae, acutae, muticae vel minute apiculatae, acute carinatae, carina fere recta, dense pubescentes, nervo unico in apicem excurrente, ferrugineae, marginibus dilutioribus, 1.5—1.75 mm longae, 1—1.2 mm latae; glumae inferiores 2 vacuae, minores. *Stamina* 2; antherae oblongo-lineares, 0.4—0.6 mm longae, connectivo in appendicem brevem ovatam producto. *Stylus* gracilis, triqueter, ad basin pyramidato-incrassatus, glaber, 1 mm longus, stigmatibus 3 quam stylus multo brevioribus. *Nux* obtuse trigona, oblongo-obovata, breviter stipitata, humiliter umbonulata, haud verruculosa, cellulis extimis transverse linearibus 3—4-serialibus longitudinaliter striata et transverse lineolata, primo alba denique brunnescens, 0.6—0.65 mm longa, 0.3—0.35 mm lata.

MALAY PENINSULA. Kedah, P. Langkawi, Batu Ayam, on limestone scree, Nov. 19, 1941: *E. J. H. Corner s.n. (type)* (SING).

28. Fimbristylis fimbristyloides (F. v. M.) Druce, Rep. Bot. Exch. Cl. Br. Isl. 1916, 1917, 623; S. T. Blake, J. Arn. Arb. 35, 1954, 221. — *Abildgaardia fimbristyloides* F. v. M., Fragm. Phyt. Austral. 8, 1874, 273. — *F. dallachyi* F. v. M. ex Benth., Fl. Austr. 7, 1878, 309; Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 18. — *F. lacei* Turr., Kew Bull. 1911, 348. — *F. disticha* (non Boeck.) Kük., Bot. Jahrb. 59, 1925, 50, an etiam 69, 1938, 258? — *F. straminea* (non Turr.) Ohwi, J. Jap. Bot. 14, 1938, 574; Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 60, ex descr.

Among its allies *F. fimbristyloides* is well characterized by its nuts being abruptly truncate at the base. The leaves are strongly falcate all

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Fig. 4. *Fimbristylis vanoverberghii* Kük. — a. Habit, × ½; b. spikelet, × 5; c. glume, × 10; d. style and stigmas, × 10; e. nut, × 10; f. anthers, × 10; g. tip of leaf, × 10. — From *Lörzing 7782* (BO).

Fig. 5. *Fimbristylis calcicola* Kern — a. Habit, × $^{2}/_{3}$; b. spikelet, × 15; c. glume, opened out, × 15; d. glume, lateral view, × 15; e. flower, × 15; f. nut, × 15; g. tip of anther, strongly enlarged; h. rhachilla, × 15; i. tip of leaf, × 10; j. cross-section of stem, × 15. — From *Corner s.n.* (SING).

in the same direction (to the right or to the left), thus giving the rosette a peculiar twisted appearance. The distribution of the species is very insufficiently known. Probably it ranges from Queensland through Malaysia and Birma to S. Korea and the Riu Kiu Islands. I have not seen the specimens cited by Ohwi (1938, 1944), but the description can only refer to *F. fimbristyloides*; although closely related, *F. straminea* Turr. certainly is a distinct species.

BIRMA. Upper Chindwin Distr., Sittung, Tammu Road: *Lace 4210* (*syntype* of *F. lacei* Turr.) (K).

SUMATRA. E. Coast Res., Toba plateau: *Sohns 56* (BO); Karolands WSW of Mt Sinabung, near Tandjung, 825 m: *Lörzing 9023* (BO); Bila, vicinity of Rantau Parapat: *Rahmat si Boeea 1703* (BM, NY, US), *1898* (NY, P); Aer Kandis near Rantau Parapat: *Rahmat si Boeea 2649* (NY), *2806* (NY, US).

JAVA. West Java, Indramayu, Plosokerep, teak forest area, on moist swamp iron-ore, in open grassland, with *Drosera indica*, 10 m: *Van Steenis 7520* (L); near Terisi, 25 m: *Van Steenis 8208* (L). Central Java, Kediri, Kenongo: *Coert 1741 p.p.* (L). Madura, Arosbaya, *Imperata* fields, 25 m: *Backer 19297* (BO, L, U). Kangean Arch., Kangean I., Tjangkramaän, *Imperata* field, 20 m: *Backer 27695* (BO); Ardjasa, moist grassfield, 25 m, one specimen among *F. adenolepis* Kern: *Backer 27049 p.p.* (BO).

BR. N. BORNEO, Tenom, "Residency", burnt clearing paths, 240 m: *Gibbs 2771* (*syntype* of *F. lacei* Turr.) (BM, K).

CELEBES. Res. Menado, subdiv. Kolone Dale, open barren way through plain, just beyond the Sokita, 50 m: *Eyma 3381* (L).

NEW GUINEA. W. New Guinea, Hollandia, hills, on paths, open localities, and in *Imperata* fields, 200 m: *Van Royen 4124* (L). NE. New Guinea, Ramu Valley: *Rogers 3008* (GH); Ramu R.: *Schlechter 13867* (K, P), *s.n.* (L); Samboga River, near Buna: *Baim s.n.* (BO). Papua, Centr. Div., Rona, Laloki R., common, wet places on open grassy hillside, 450 m: *Brass 3576* (BO, GH, L, NY).

AUSTRALIA. Queensland, ad oram Rockingham's Bay: *Dallachy s.n. (type)* (K).

29. Fimbristylis intonsa S. T. Blake, J. Arn. Arb. 35, 1954, 221, f. 2.

This species recently described from New Guinea, Papua (*Brass 7841*, *type-coll.*, in BM, GH, U!) occurs also in North Sumatra.

SUMATRA. E. Coast Res., Prapat, in *Themeda*-fields, scattered among tall grasses, 1000 m: *Beumée A 446* (BO); vicinity of Rantau Parapat, Bila: *Rahmat si Boeea 1796* (L, NY, US). Tapanuli, along the Toba trail north of the Asahan R., between Tutupan and Si Makkuk: *Bartlett 7535* (US); Asahan valley, above Wilhelmina waterfall, moist localities, 975 m: *Lörzing 10021 A* (BO).

30. Fimbristylis disticha Boeck., Linnaea 38, 1874, 393; C. B. Clarke, Fl. Br. Ind. 6, 1893, 651. — *F. fuscoides* (non C. B. Clarke) Camus, Fl. Gén. I. C. 7, 1912, 124.

The only records for Malaysia (NE. New Guinea), are those by Kükenthal (Bot. Jahrb. 59, 1924, 50; 69, 1938, 258). *Schlechter 13867* (K, P!) on which the first record was based, belongs to *F. fimbristyloides* (F. v. M.) Druce. The second record, based on *Clemens 4312*, which I have not seen, becomes very doubtful.

Balansa 189 from Tonkin, Ouonbi (P!), as *F. disticha* in Camus, Fl. Gén. I. C. 7, 1912, 125, appears to belong to the remote *F. leptoclada* Benth. On the other hand, *Godefroy 908* from Cochin China, Phu-quoc (P!), and *Pierre s.n.* from Cochin China (P!), represent typical *F. disticha*; both collections were referred to *F. fuscoides* C. B. Clarke (Camus l. c., 124) which is also quite distinct from *F. disticha*.

F. disticha ranges from India and S. China through Indo China and

Tenasserim to N. Sumatra. The Sumatran specimens agree perfectly with those of the type-collection (*Helfer 6143/1*) in the Leiden Herbarium.

SUMATRA. Tapanuli, Lalang bench south of the Asahan R., between a point above Tangga and Parduaan, Habinsaran: *Bartlett 8049* (NY, US); Habinsaran Plateau, ESE of Toba Lake, open grassy plains, 1200—1400 m: *Lörzing 6506, 6507, 6646* (BO); Rahutbosi Dolok, 1200 m: *Van der Meer Mohr 151* (BO).

31. **Fimbristylis sieberiana** Kunth, En. Plant. 2, 1837, 237; Steud., Syn. Plant. Glum. 2, 1855, 118; Miq., Fl. Ind. Bat. 3, 1856, 326. — *F. ferruginea* (non Vahl) Decne, Nouv. Ann. Mus. Hist. Nat. Paris 3, 1834, 352; Herb. Timor. Descr. 1835, 34. — *F. ferruginea* var. *sieberiana* (Kunth) Boeck., Linnaea 37, 1871, 17; Chermez., Fl. Madag. fam. 29, 1937, 181. — *F. paucispicata* F. v. M., Fragm. Phyt. Austral. 1, 1859, 197. — *F. ferruginea* var. *foliata* Benth., Fl. Austral. 7, 1878, 312, excl. syn. *F. arvensis* Vahl et *F. tristachya* R. Br., l. c.

Closely allied to *F. ferruginea* (L.) Vahl, but in my opinion a well characterized species. The differences between the two were already clearly given by Kunth (1837).

LESSER SUNDA ISLANDS. Timor: *Leschenault* (K, L, P); W. Timor, Tjamplong, 250 m: *Proppe 24* (BO); Port. Timor, Caicoli, brackish marsh behind Dili, in erect tufts as those of a *Juncus*, c. 1 m tall: *Van Steenis 17988* (L).

PHILIPPINES. Mindanao, Cotabato Prov., Buayan: *Ramos & Edaño BS 85126* (GH).

AUSTRALIA. Upper Victoria River: *F. v. Müller* (*type* of *F. paucispicata* F. v. M.; *lectotype* of *F. ferruginea* var. *foliata* Benth.) (K); Springsure, *Wuth* (K).

32. **Fimbristylis pubisquama** Kern, nom. nov. — *F. compressa* Boeck., Linnaea 38, 1874, 387; C. B. Clarke, Fl. Br. Ind. 6, 1893, 639; Camus, Fl. Gén. I. C. 7, 1912, 108, non R. et S., Syst. Veg. 2, 1817, 100.

Only one Indochinese collection of this rare species has been reported by Camus. In the Paris Herbarium I have seen the collections cited below. The species has to be renamed on account of Roemer and Schultes's earlier homonym.

INDO CHINA. Cochin China: *Thorel 465* (P), *Pierre s.n.* (P); marais aux environs de Saïgon, juin 1864: *Lefèvre 485* (P).

33. **Fimbristylis tristachya** R. Br., Prodr. 1810, 226; Kunth, En. Plant. 2, 1837, 242; Steud., Syn. Plant. Glum. 2, 1855, 108. — *F. marianna* Gaudich. in Freyc., Voy. Bot. 1826, 413, excl. varr.; Kunth, En. Plant. 2, 1837, 236; Steud., Syn. Plant. Glum. 2, 1855, 109; Merr., En. Philip. Fl. Pl. 1, 1923, 124; Kük., Bot. Jahrb. 59, 1924, 5; S. T. Blake, J. Arn. Arb. 35, 1954, 212. — *F. bispicata* var. *monostachya* Nees in Hook. J. Bot. 6, 1854, 29. — *F. polymorpha* var. *c* Boeck., Linnaea 37, 1871, 16. — *F. nutans* (non Vahl) Naves, Nov. App. 1882, 307; Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284. — *F. maxima* K. Schum. in Schum. & Hollr., Fl. Kaiser Wilh. Land 1889, 24, non Schum. & Laut., Fl. Deut. Schutzgeb. Süds. 1901, 196. — *F. subbispicata* (non Nees) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 92, incl. var. *caesia* quoad specim. cit.; Merr., En. Philip. Fl. Pl. 1, 1923, 126. — *F. annamica* Camus, Not. Syst. 1, 1910, 245; Fl. Gén. I. C. 7, 1912, 95. — *F. alleizettei* Camus, Not. Syst. 1, 1910, 291; Fl. Gén. I. C. 7, 1912, 112. — *F. marianna* var. *foenea* Kük. in Fedde, Rep. 16, 1920, 432; Merr., En. Philip. Fl. Pl. 1, 1923, 124. — *F. podocarpa* (non Nees) Ridl., Fl. Mal. Pen. 5, 1925, 155. — *F. schoenoides*

(non Vahl) Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 159, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 23, p.p.

Fimbristylis tristachya extends from India to Micronesia and Australia. It is widely distributed in Malaysia, but was generally confounded with the allied *F. schoenoides* (Retz.), from which it can always be distinguished by the characters given in the key on p. 155. It is much nearer to and possibly not specifically distinct from *F. subbispicata* Nees & Mey. ex Nees, occurring in E. Asia (China, Korea, Formosa, Japan, Riu Kiu Islands).

MARIANNAS: *Gaudichaud s.n.* (*type* of *F. marianna* Gaudich.) (P).

INDO CHINA. Tonkin, Quang Yen: *d'Alleizette 314* (*type* of *F. alleizettei* Camus) (P). Annam, Lang-bian: *André s.n.* (*type* of *F. annamica* Camus) (P).

SUMATRA. E. Coast Res., Si Mandi Angin, on the Sungei Kanan: *Rahmat si Boeea 4080* (NY, US).

MALAY PENINSULA. Setul, heaths: *Ridley 14878* (BM, K, SING). Perlis, Kanga: *Ridley 14879* (SING), *s.n.* (BM). Kedah, Alor Sta, rice-fields, *Ridley 14876* (BM, K, SING). Selangor, Ampang: *Hume 7333, 7347, 7391* (K, SING); Kuala Lumpur, swamps: *Hume 7711* (SING); Salak S. Road: *Seimund s.n.* (K). Singapore: *Corner s.n.* (SING), *Holttum SF 37793* (BO, SING), *Sinclair SF 38906* (BO, L, SING).

JAVA. W. Java, Cheribon, forestry Indramayu, 20—30 m: *Van Steenis 6693* (BO, L, SING); forestry Plosokerep, 30 m: *Van Steenis 7484* (BO, K, L), *7510* (BO, L). E. Java, Madiun, Gendingan, grassfield in teak forest, 70 m: *Backer 30377*; Surabaya, G. Sahari, grassfield, 30 m: *Backer 26545* (BO, L); Darmo: *Dorgelo 1644 p.p.* Madura, experimental field: *Landbouwopz. Tundjung 7* (BO); hills SW of Ketapangdaja, *Imperata* field, 100 m: *Backer 19914* (BO, L); between Sampang and Rapa, *Imperata* field, 50 m: *Backer 20056* (BO); hills NW of Rapa, grassfields, 175 m: *Backer 20245* (BO); Pamekasan, 25 m: *Beumée A 887* (BO).

LESSER SUNDA ISLANDS. E. Sumba, Lea plain, swampy grassland, 500 m: *De Voogd 2521* (BO). Port. Timor, plateau of Fuiloro (Lautem), site of Mehara, on grassflats: *Van Steenis 18094* (L).

BORNEO: *Barber 251* (K); Labuan: *Hose 94* (S), *s.n.* (SAR).

PHILIPPINES: *Loher 747* (K). Palawan, Taytay: *Merrill 9322* (BO, GH, K, L, NY, P, SING). Busuanga, Malbato: *Marche 420* (P). Luzon: *Cuming 1413* (BM, FI, G, K, P). Ilocos Norte Prov., Burgos: *Ramos 32690* (K, P); Bangui: *Ramos BS 27625* (BO, K, L, NY, P, US); Cagayan Prov.: *Ramos 7894* (US); Isabela Prov.: *Clemens 18020bis* (L, NY), *Ramos BS 8074* (NY); Prov. of Bulacan: *Ramos Phil. Pl. 1447* (BM, BO, G, GH, L, NY, P, SING); Manila: *Merrill 9796* (BO, K, NY, P), *Rogerson 1003* (US); Albay Prov., Pili Hot Springs: *Mearns BS 2885* (BO, NY). Bohol: *Ramos 42936* (G, SING). Guimara Is., Salvacion, Iloilo Prov.: *Soriano PNH 16398* (L). Mindanao, Davao Prov., Tibanban: *Edaño PNH 11025* (L).

CELEBES. SW. Celebes, NNE of Rapang, 75 m: *Eyma 357* (BO, L, U); Wadjo, grassfields: *Van Steenis 10373* (BO). SE. Celebes, Rumbia: *Elbert 3076* (L); Pundidaha, *Imperata* field, 100 m: *Kjellberg 1189* (BO, L).

NEW GUINEA. W. New Guinea, hills near Kubaju R., swamp, 240 m: *Van Royen 4490* (L); Andjai, *Imperata* fields, 540 m: *Van Royen 3964* (L); prob. Dompta: *Anang s.n.* (BO, L). NE. New Guinea, grassy hills on Augusta R.: *Hollrung 836* (*type-coll.* of *F. maxima* K. Schum.) (BO, P). Papua, W. Div., Wuroi, Oriomo R., common all through savannahs, 10—30 m: *Brass 5734* (BO, GH, L); Lake Daviumbu, common on wet grass plains: *Brass 7847* (BM, BO, GH. U), *7878* (BM, BO, GH, K, U).

AUSTRALIA. Littora Novae Hollandiae intra tropicum: *R. Brown 5941 (type)* (K).

34. Fimbristylis alata Camus, Not. Syst. 1, 1910, 244, f. 13. 1—2; Fl. Gén. I. C. 7, 1912, 94, f. 14, 1—2.

Camus based this species on three Indochinese collections, all preserved in the Paris Herbarium: Laos, Phuoc-than: *Thorel*; Laos, Bassac: *Thorel*; Cochin China, Ti-tinh: *Talmy*. His description is inaccurate in several respects. I fail to see the slender stolons described, the glumes are not fimbriate on the margins, there were never 2 stamens in the flowers I examined, the nut is not longitudinally striate, and there are always 2 stigmas. Besides, the specimens being not conspecific, Camus's description represents, moreover, a mixture of characters pertaining to two clearly distinct taxa.

In *Thorel s.n.* from Bassac, apparently an annual plant, the spikelets are 1—3 cm × 3 mm, the glumes very broadly ovate, about 4 mm long and wide, the ovary is broadly winged in the upper part with the wings adnate to the lower part of the style, the style is glabrous, up to 2 mm long, the anthers are $1^1/_2$—$1^3/_4$ mm long, and the nut is distinctly winged, about $1^3/_4$ mm long, with a stipe about $^1/_4$ mm long.

In *Thorel s.n.* from Phuoc-tan and in *Talmy s.n.* from Ti-tinh, both perennials with a woody rhizome, the spikelets are $1^1/_2$—$3^1/_2$ cm × 4—5 mm, the glumes ovate, 6—7 mm long, $4^1/_2$—5 mm wide, the wings of the ovary not adnate to the style, the style is fimbriate in the upper half, $3^1/_2$—4 mm long, the anthers are $2^1/_2$—3 mm long, the nut is indistinctly winged, 2 mm long, with a stipe $^1/_2$—$^3/_4$ mm long.

To the Talmy specimens Camus remarked "fruit très jeune et non ailé pour cette cause." However, the wings are more distinctly visible in immature nuts than in mature ones. In the ovary they are thinly membranous and finely transversely striate, in the mature nuts they are indurate and often only discernible by the transverse striation different from the reticulation of the nut proper.

I choose *Thorel s.n.* from Bassac for the lectotype of *F. alata* Camus, and I appoint *Thorel s.n.* from Phuoc-tan to be the type of a related new species, *F. subalata* Kern.

INDO CHINA. Laos, Bassac, expédition du Mé-Kong: *Thorel s.n. in 1866—68 (lectotype)* (P; dupl. in L).

35. Fimbristylis subalata Kern, spec. nov. — Sect. *Dichelostylis* Benth. — *Fig. 2.*

Herba perennis, glabra, rhizomate lignoso breviter repente, vaginis ovatis striatis fuscis cincto, usque ad 4 cm longo. *Culmi* approximati vel fasciculati, tenues, obtuse trigoni, striato-sulcati, laeves, ad basin vaginis fuscis cincti, 50—65 cm alti, c. 1 mm crassi. *Folia* pauca, culmo subbreviora, erecta, rigida, filiformia, acuta, laeves vel ad apicem scaberula, $^1/_2$—$^3/_4$ mm lata, marginibus involutis; ligula brevis, truncata, membranacea. *Inflorescentia* 1-spiculata. *Spicula* erecta, elliptica vel oblonga, teres, acuta, multiflora, ferruginea, $1^1/_2$—$3^1/_2$ cm longa, 4—5 mm lata. Rhachilla anguste alata. *Glumae* spiraliter dispositae, chartaceae, adpressae, ovatae, obtusae, muticae vel inconspicue apiculatae, vix carinatae, nervo medio prominente, utrinque nervulis lateralibus c. 10 percursae, 6—7 mm longae, $4^1/_2$—5 mm latae, marginibus in parte superiore scariosis. *Stamina* 3, antheris linearibus $2^1/_2$—3 mm longis. *Stylus* compressus, basi leviter dilatatus, dimidio superiore fimbriatus, $3^1/_2$—4 mm longus, 0.3—0.4 mm latus, stigmatibus 2 quam stylus brevioribus. Ovarium membranaceo-alatum. *Nux* biconvexa, obovata, gynophoro conspicuo $^1/_2$—$^3/_4$ mm longo stipitata, ad apicem indistincte alata et insertione styli 0.6—0.8 mm lato emarginata, laevis,

cellulis minutis hexagonalibus indistincte reticulata, 2 mm longa, 1.2—1.3 mm lata.

SIAM. Kanchanadit, Surat, in savannah, 5 m: *A. Kerr 13142* (K, L).

INDO CHINA. Laos, Phuoc-than: *Thorel s.n. in 1862—66 (type)* (P); Cochin China, Ti-tinh: *Talmy s.n.* (P). Cambodia, Kadak, kil. 21 de Kampot, route de Réam, herbe en bordure de la route, sol sableux peu inondé: *Poilane 27350 p.p.* (P).

NEW GUINEA. Papua, Western Div., Lake Daviumbu, Middle Fly R., small wiry tufts, scattered on wet grass plains, Sept. 1936: *Brass 7846* (GH).

36. **Fimbristylis caesia** Miq., Fl. Ind. Bat. 3, 1856, 315. — *F. subbispicata* Nees var. *caesia* (Miq.) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 92, haud quoad specim. cit. — *F. monostachya* (non Hassk.) Backer, Onkruidfl. Jav. Suikerrietgr. 1928, t. 174, non al. — Descr. emend. — Sect. *Dichelostylis* Benth.

Herba glabra, probabiliter annua. *Culmi* fasciculati, erecti, obtuse compresso-trigoni, striati, laeves, ad basin foliati, 20—40 cm alti, $^{1}/_{2}$—1 mm crassi. *Folia* culmo multo breviora, plana, apice obtusa, marginibus superne scabra, caeterum laevia, supra celluloso-reticulata subtus pluristriata unicostulata, glaucescentia, 1—$1^{1}/_{4}$ mm lata, laminis intus ad basin ligula truncata brevissima ciliolata a vagina distincte separatis; vaginae pallide virentes, laeves, striatae, vix carinatae, 2—5 cm longae. *Anthela* 1—3-spiculata; radii si adsunt brevissimi, usque ad 1 cm longi. Bracteae involucrales glumaceae vel setaceae, 3—10 (rarius usque ad 40) mm longae. *Spiculae* solitariae, oblongo-ovatae, teretes, acutissimae, densiuscule pluriflorae, saepe tortae, pallide stramineae et brunneo-variegatae, 10—20 mm longae, 3—4 mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, chartaceae, adpressae, late deltoideo-ovatae, obtusae, mucronulatae, vix carinatae, plurinerviae, marginibus scariosis, $4^{1}/_{2}$—5 mm longae, 4 mm latae. *Stamina* 3, antheris linearibus 1 mm longis, connectivo in appendicem brevem hyalinam laevem producto. *Stylus* compressus, latiusculus, basi leviter dilatatus, 2 mm longus, marginibus dimidio superiore ciliatis; stigmatibus 2 quam stylus multo brevioribus. *Nux* biconvexa, obovato-elliptica, gynophoro conspicuo $^{3}/_{4}$ mm longo stipitata, ad apicem insertione styli c. 0.5 mm lato truncato-emarginata, cellulis extimis minutis rotundis haud impressis reticulata, straminea, $1^{1}/_{2}$—2 mm longa, 1.1—1.3 mm lata.

A well characterized species, neglected or misunderstood since it was published by Miquel. *Loher 747*, which according to Clarke (1907) "appears to match exactly the authentic example of *F. caesia* Miq." belongs to *F. tristachya* R. Br.

JAVA, in oryzetis: *Blume s.n.* (L). W. Java, Batavia (= Djakarta): *Junghuhn 532 (type)* (L), *s.n.* (U); between Dawuhan and Kalari, among grasses along roadside, rather dry, 50 m: *De Wit 4095* (L). Central Java, Cheribon, Nunuk-Tjihaur, brushwood and grassy plains: *Van Steenis 12516* (BO, L, SING); Semarang, near Kedungdjati, edge of rice-field on heavy clay, 75 m: *Beumée A 223* (BO); Surakarta, dry road-side, abundant, 110 m: *Backer 30362* (BO, L). E. Java, Purwodadi, very common, 175 m: *Coert 500* (BO, L); Surabaya, old rice-field: *Dorgelo 1664, p.p.* (L); Tampung, Kedawung, E of Pasuruan, heavy blackish brown brackish moist clay: *Kooper s.n.* (L).

PHILIPPINES. Luzon, Manila: *MacGregor 70* (K); Pangasinan Prov.: *Ramos BS 4930* (L, NY, P, US); Prov. of Rizal, San Pedro Macati: *Merrill Phil. Pl. 507* (FI, G, U, US).

37. **Fimbristylis bisumbellata** (Forsk.) Bub., Dodec. 1850, 30; C. E. C. Fischer, Kew Bull. 1935, 149; Fl. Madras 11, 1936, 1898, in corrig.; Ohwi, Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 85. — *Scirpus bisumbellatus* Forsk., Fl. Aeg.-Arab. 1, 1775, 15. — *F. dichotoma* Vahl, En. Plant. 2, 1806, 287, p.p.; Kunth, En. Plant. 2, 1837, 225, p.p.; Boeck., Linnaea 37, 1871, 12, p.p.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 635; Philip. J. Sc. 2, 1907, Bot. 93; Koord., Exk. Fl. Java 1, 1911, 199; Camus, Fl. Gén. I. C. 7, 1912, 102, p.p. — *Scirpus pallescens* Roxb., Fl. Ind. 1, 1820, 229. — *F. pallescens* (Roxb.) Nees in Wight, Contr. Bot. Ind. 1834, 101; Steud., Syn. Plant. Glum. 2, 1855, 111.

F. bisumbellata, widely distributed in the Old World Tropics and extending to the temperate regions, is extremely rare in Malaysia. It is only once recorded, viz for the Philippines by Clarke (1907) as *F. dichotoma*, which record Merrill (1923) wrongly referred to *F. annua* (All.) R. & S. (= *F. dichotoma* Vahl, non Clarke).

Clarke, l. c., is of the opinion that *F. bisumbellata* is only distinguishable from *F. dichotoma* by characters of trifling importance. However, I always find the much smaller spikelets, the smaller, membranous, mucronate, sharply keeled glumes, the much shorter style, and the smaller nut sufficiently differentiating characters.

MALAYA, probably Borneo: *Lobb s.n.* (BM); wrongly localized?

JAVA: *Labillardière s.n.* (FI); res. Surabaya, Modjokerto, along Brantas R., 15 m: *Radermacher s.n.* (L).

PHILIPPINES. Luzon, Prov. of Cagayan: *Castillo BS 22716* (BM); Isabela Prov.: *Clemens 16582* (NY); Nueva Ecija, Carranglang, sandy river bar: *Merrill 261* (BO, US); Luzon central: *Loher 1342* (P, US).

38. **Fimbristylis merrillii** Kern, spec. nov. — *F. squarrosa* (non Vahl) Merr., En. Philip. Fl. Pl. 1, 1923, 126, p.p. — *F. annua* var. *gracilis* Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 160, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 21, p.p. — Sect. *Fimbristylis* — *Fig. 6.*

Annua. *Culmi* fasciculati, erecti, tenues, compresso-trigoni, laeves, sursum saepe parce pubescentes vel glabrescentes, ad basin foliati, (2—)15—30(—40) cm alti, $^1/_2$—1 mm crassi. *Folia* culmo 2—3-plo breviora, plana, acutiuscula vel obtusiuscula, supra celluloso-reticulata, subtus nervata interdum pubescentia, 5—15 cm longa, 1—2 mm lata, marginibus saepe ciliolato-puberulis apicem versus spinuloso-scabris, laminis intus ad basin serie ciliolarum a vagina separatis; vaginae plerumque glabrescentes, in parte priore membranaceae, ferrugineae. *Anthela* simplex vel composita, diffusa, laxa, plurispiculata, rarissime ad spiculam singulam reducta, plerumque 3—5 (—10) cm longa et lata. Bracteae involucrales 1—3, oblique erectae, quam inflorescentia breviores vel ei longitudine aequales, ad basin dilatatam plerumque ciliato-puberulae, ima 1—3(—6) cm longa. Anthelae radii pauci vel plures (usque ad 8), graciles, oblique ascendentes, glabri laevesque, 1—4(—8) cm longi. *Spiculae* solitariae, ovatae vel ovato-oblongae, teretes, acutae, densiuscule pauci-pluriflorae, 3—7 mm longae, $1^1/_2$—2 mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, undique imbricatae, adpressae, subchartaceae, late ovatae, acutiusculae, minute mucronulatae vel submuticae, vix carinatae, glabrae laevesque, nitidae, $1^1/_2$—2 mm longae, c. $1^1/_2$ mm latae, dorso trinervio, lateribus rufo-brunneis, marginibus vix albo-scariosis. *Stamina* 1(—2), antheris oblongis vel breviter linearibus,

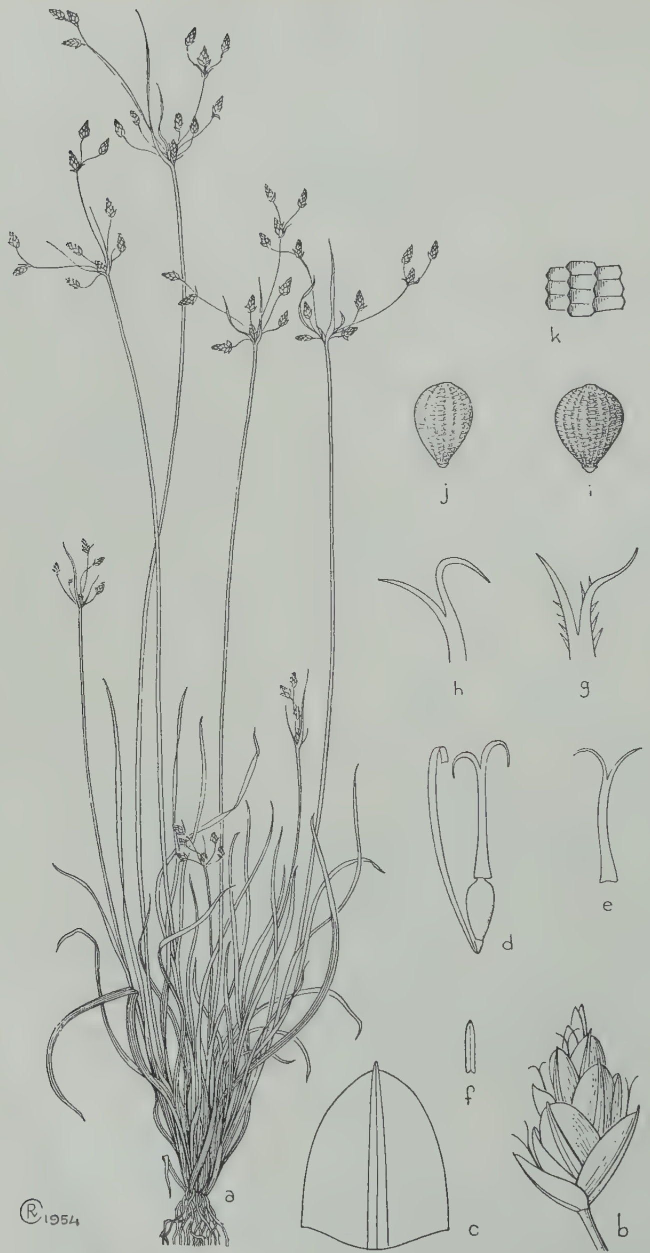


Fig. 6. *Fimbristylis merrillii* Kern — a. Habit, × 3/5; b. spikelet, × 6; c. glume, × 12; d. flower, × 12; e. style and stigmas, × 12; f. anther, × 12; g-h. stigmas, × 25; i-j. nuts, × 12; k. outer cells of nut. — From *Ramos 1431* (NY).

$^{1}/_{3}$—$^{1}/_{2}$ mm longis. *Stylus* tenuis, compressus, basin versus dilatatus, marginibus non vel vix extenuatus, glaber vel ad bifurcationem ciliis 1—4 perparce ciliatus, $^{3}/_{4}$—1 mm longus, stigmatibus 2 tenuibus brevibus. *Nux* biconvexa, obovata vel late obovata, breviter stipitata, umbonulata, non vel parce verruculosa, primo albida, denique straminea vel brunnescens, 0.6—0.9 mm longa, 0.5—0.7 mm lata, utrinque longitudinaliter 5—6(—9)-striata, transverse multilineolata, cellulis extimis impressis transverse oblongis trabeculata.

I have taken up the name provisionally given by Palla in 1913 to some specimens of this species in the Herbarium of the New York Botanical Garden, labelled "Philippines". All other data concerning these specimens lacking, I have chosen *Ramos Phil. Pl. 1431* as the type collection.

Fimbristylis merrillii is closely related to *F. dichotoma* (L.) Vahl, from which it is apparently markedly distinct, however. It is much smaller in all its parts, with narrower leaves, and can be at once distinguished by the narrower spikelets only $1^{1}/_{2}$—2 mm wide and the glabrous or almost glabrous style. The only extra-Malaysian collection I have seen is from Yunnan.

CHINA. Yunnan, marais, Chouang che teou près Ta pin tze: *Delavay 4821* (L, P).

SUMATRA. Atjeh, Ketol Valley, 800—1000 m: *Jochems s.n.* (L).

JAVA. Without precise locality: *Zollinger it. sec. 3796* (BM, FI, G, P). West Java, Tjidjantung near Djakarta, cassava-plantation, 40 m: *Beumée 900* (BO); Bogor: *Boerlage s.n.* (L); Palabuan Ratu, 10 m: *Koorders 34680 β* (BO); Indramayu, Plosokerep, teak forest area, on moist swamp iron-ore in open grassland, with *Drosera indica*, 10 m: *Van Steenis 7520a* (BO). Central Java, Pekalongan, forestry Margasari, teak forest, swampy places and shallow pools, 100 m: *Beumée 5198* (BO); Semarang, bank of Kali Garam, swamp, 60 m: *Docters van Leeuwen 1218* (BO, L); Semarang, Bangkong, hills, among grasses: *Docters van Leeuwen s.n.* (BO); Klaten, Ngupit Estate: *Ostendorf s.n.* (BO). East Java, between Bangil and Modjokerto, rice-field, 15 m: *Backer 37195* (L); Grisee: *Dorgelo 3304* (L); Kediri: *Coert 1741 p.p.* (L); W. Baluran, temporarily moist localities in open savannah, 50 m: *Rappard 142* (BO). Madura. Tanah merah, dry rice-field, 50 m: *Backer 19377* (BO); same locality, *Imperata* field, 50 m: *Backer 19402* (BO); between Rapa and Karang Pinang, *Imperata* fields, 100—180 m: *Backer 20113* (BO, L); Pagantenan, sandy fields, 300 m: *Backer 20599* (BO); hilly country N of Sumenep, rice-field, 50 m: *Backer 20725* (BO). Kangean Archipelago. Kangean Isl., Tambajangan: *Backer 27477b* (BO); Paliat Isl., teak forest, 10 m: *Backer 29639* (BO, L).

LESSER SUNDA ISLANDS. Tenimber, P. Jamdena, 15 km ENE of Otimmer, *Melaleuca* forest surrounded by primary forest with wild cattle, low: *Buwalda 4547* (K).

PHILIPPINES. Luzon, Prov. Bataan, Lamao R., Mt Mariveles: *Williams 45 & 64* (NY); Zambales Prov.: *Baim s.n.* (GH); Prov. of Bulacan: *Ramos Phil. Pl 1431 (type-coll., holotype in* NY) (BM, BO, G, GH, L, NY, P, SING), *Ramos 1443 p.p.* (2 specimens among *F. podocarpa* Nees) (BO); Prov. of Bulacan, Angat: *Ramos 21739* (BO, K, P); Prov. of Rizal: *Ramos BS 12539* (BM, P); Prov. Laguna, Los Banos, 90 m: *Holman 54* (GH). Panay, Prov. Ilo-Ilo, Miagas: *Vidal 3984* (K). Mindanao, vicinity of Tanculan, Bukidnon Subprov.: *Fénix BS 26093* (NY, US).

CELEBES. Bt Parangpeda, near Bonto Parang, among grasses and in brushwood, 70 m: *Bünnemeijer 10682* (BO, L); NNE of Rapang, pasture near S. Karadjae, 75 m: *Eyma 347* (BO, L); Pare-pare, o m: *Kjellberg 3739a* (BO).

NEW GUINEA. Papua, Kanosia, by small stream in open savannah land, 15 m: *Carr 11198* (L, NY), *11264* (BM, K, L, NY).

39. **Fimbristylis tenuinervia** Kern, spec. nov. — Sect. *Fimbristylis* — *Fig. 7.*

Probabiliter annua. *Culmi* dense fasciculati, erecti, graciles, obtuse

trigoni, subcompressi, tenuiter sulcati, glabri laevesque, ad basin foliati, 15—35 cm alti, c. $^1/_2$ mm crassi. *Foliorum laminae* culmo $^1/_3$ breviores vel ei longitudine aequales, subfiliformes, acutae, glabrae, c. 1 mm latae, intus ad basin serie pilorum alborum a vagina separatae, marginibus saepe involutis apicem versus antrorse parce scaberulis; vaginae glabrae vel parce puberulae, in parte priore pallide membranaceae, usque ad 5 cm longae, ore oblique fisso fimbriato, dorso ecarinato. *Anthela* composita vel subdecomposita, rarius simplex, perlaxa, (3—)10—35-spiculata, (2—)3—7 cm longa. Bracteae involucrales 3—5, foliis consimiles, erecto-patentes, ad basin dilatatam scarioso-marginatae, glabrae vel ciliolatae, ima usque ad 10 cm longa. Anthelae radii (2—)5—7, tenues, erecto-patentes, glabri laevesque, usque ad 4 cm longi; pedicelli filiformes, usque ad 1 cm longi. *Spiculae* solitariae, oblongo-lanceolatae, teretes, acutissimae, densiuscule pluriflorae, nitide brunneae, 4—5 mm longae, $1^1/_4$—$1^1/_2$ mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, undique imbricatae, adpressae, subchartaceae, late ovatae, apiculatae vel minute mucronulatae, vix carinatae, glabrae, in parte superiore rufo-brunneae, basin versus dilutiores, $2^1/_4$—$2^3/_4$ mm longae, 2—$2^1/_2$ mm latae, nervo medio prominente, lateribus utrinque tenuiter 5—8-nervulosis et saepe a lineis 2—3 fuscis percursis, marginibus scariosis; glumae inferiores 2—3 vacuae, multo breviores. *Stamina* 3, antheris linearibus (1—)$1^1/_4$—$1^1/_2$ mm longis, luteis, connectivo in appendicem brevem albo-hyalinam laevem producto. *Stylus* tenuis, compressus, basin versus vix dilatatus, dimidio superiore fimbriatus, $1^1/_4$—$1^3/_4$ mm longus, stigmatibus 2 quam stylus brevioribus. *Nux* biconvexa, anguste obovata, breviter stipitata (gynophoro c. 0.1 mm longo), cellulis extimis transverse ob-

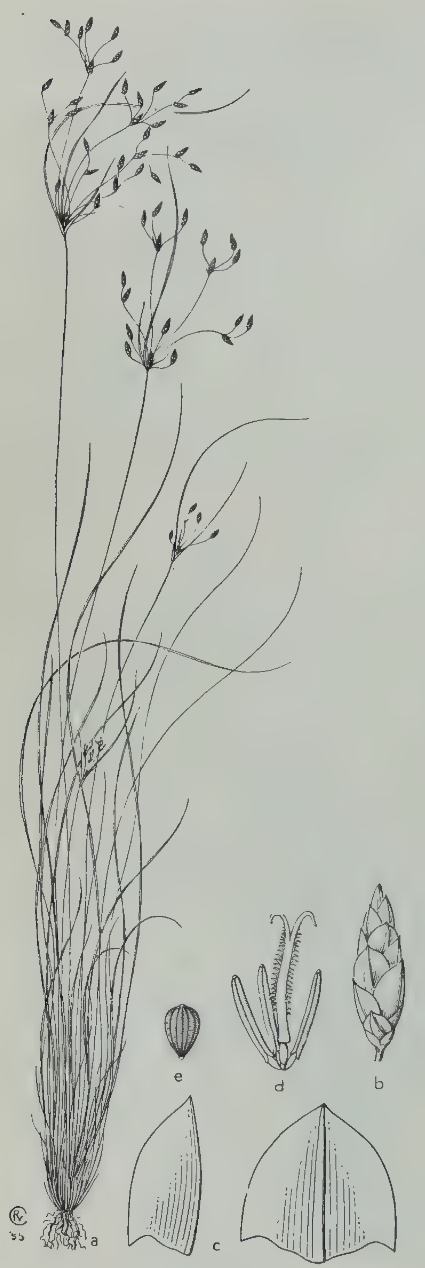


Fig. 7. *Fimbristylis tenuinervia* Kern — a. Habit, × ½; b. spikelet, × 5; c. glumes, × 10; d. flower, × 10; e. nut, × 10. — From *Rogerson 1005* (US).

longo-linearibus impressis trabeculata, utrinque longitudinaliter 4—6-striata, transverse multilineolata, humiliter umbonulata, alba vel pallide straminea, 0.7—0.9 mm longa, 0.5—0.6 mm lata.

Like the preceding this species belongs to the intricate section *Fimbristylis* [type species: *F. dichotoma* (L.) Vahl]. From the latter species it can be distinguished at once by the very small, narrow spikelets, the almost filiform leaf-blades, and the many-nerved glumes. By the size of its spikelets it has much more resemblance with the following allies of *F. dichotoma* with trabeculate nuts: *F. bisumbellata* (Forsk.) Bub., *F. perlaxa* Ohwi, *F. merrillii* Kern and *F. trichophylla* Ridl.

F. bisumbellata has broader leaves, angular spikelets, 3-nerved much smaller thinly membranous distinctly mucronate keeled glumes, 1(—2) stamens with much smaller anthers, narrower style, and smaller broadly obovate or obovate nuts.

In *F. perlaxa* the spikelets are somewhat larger, the glumes membranous, keeled, 3-nerved, the 2 stamens have oblong anthers $^1/_3$—$^1/_2$ mm long, and the nut is broadly elliptic, almost orbicular, with 15—18 longitudinal ribs on each face.

F. merrillii is characterized by the smaller glumes, the quite or almost glabrous shorter style, the 1(—2) stamens with oblong anthers $^1/_3$—$^1/_2$ mm long, the 3-nerved glumes, and the obovate or broadly obovate nuts.

F. trichophylla has a less developed inflorescence, somewhat broader spikelets 2—2$^1/_2$ mm wide, the appendage of the connective setulose, the nut oblong-obovate, indistinctly trabeculate with 10—12 vertical rows of cells on each face; the leaves have no ligule.

Loher 756, 757, and *758* in the Kew Herbarium mounted on the same sheet, were all determined by Clarke in 1898 as "*F. diphylla*, Vahl *forma Malasica*" with the remark "With a very narrow nut, perhaps as good a claim to specific separation as several species hereabout can shew." In my opinion *Loher 756* represents ordinary *F. dichotoma*, and *Loher 758* belongs to *F. alboviridis* C. B. Clarke. Clarke's remark can only refer to *Loher 757*. *Loher 758* in the Paris Herbarium is identical with *Loher 757* in Kew. It is also determined by Clarke as *F. diphylla* Vahl *forma Malasica.* As far as I know this name was never published.

PHILIPPINES. Luzon, near Wack-Wack Country Club, 3 miles east of Manila, in dense mats on moist meadows, Aug. 5, 1945, *Clark T. Rogerson 1005 (type)* (US); Luzon central: *Loher 757* (K), *758* (P; the same number in K is *F. alboviridis* C. B. Clarke).

40. Fimbristylis podocarpa Nees & Mey. ex Nees in Wight, Contr. Bot. Ind. 1834, 98, p.p. typ.; Nov. Act. Ac. Nat. Cur. 19, Suppl. 1, 1843, 77, p.p.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 638; Philip. J. Sc. 2, 1907, Bot. 94; Ill. Cyp. 1909, t. 42, f. 5—6; Koord., Exk. Fl. Java 1, 1911, 199; Camus, Fl. Gén. I. C. 7, 1912, 107; Merr., En. Philip. Fl. Pl. 1, 1923, 125. — *F. squarrosa* (non Vahl) Zoll., Syst. Verz. 1, 1854, 61, p.p. (specim. glaucescentia). — *F. diphylla* var. *pluristriata* C. B. Clarke, Fl. Br. Ind. 6, 1893, 637; Ill. Cyp. 1909, t. 42, f. 3—4. — *F. diphylla* (non Vahl) K. Schum. & Laut., Fl. Deut. Schutzgeb. Süds. 1901, 196, quoad Lauterbach 348. — *F. annua* var. *podocarpa* (Nees) Kük., Bot. Jahrb. 59, 1924, 48. — *F. diphylla* var. *podocarpa* (Nees) Kük., Bot. Jahrb. 69, 1938, 257.

Recorded by Clarke from "Malaya" (1893) and Luzon (1907). Kükenthal (1924) recorded it from New Britain (*Dahl s.n.*, not seen), and in 1938 from Papua, Central Division, Kanosia (*Carr 11034*); the specimens of the latter collection in the Leiden and New York Herbarium, however, belong to *F. dichotoma* (L.) Vahl.

F. diphylla var. *pluristriata* was said by Clarke (1893) to be a very common southern, especially Malay form. I fail to distinguish between the specimens named by Clarke as *F. podocarpa*, and those he referred to *F. diphylla* var. *pluristriata*. There are, for instance, two sheets of *Zollinger 413* in the Geneva Herbarium, one of which Clarke labelled "*F. podocarpa*, Nees", the other "*F. diphylla*, Vahl *forma pluristriata*, with numerous striae to the nut", both determinations dated July 1888; the specimens are quite identical.

Malay Peninsula. Pahang, Simpai Sat, Ulu Tembeling, low alt.: *Henderson SF 22083* (BO, NY, SING).

Java. West Java, ad vias pr. Tjikoya: *Zollinger 413* (FI, G, GH, L, P), *1591* (P); Cheribon, forestry Indramayu, grassfields, 20—30 m: *Van Steenis, 6692* (BO, GH, L, SING). East Java, Purwodadi, 175 m: *Coert 499* (BO, L). Kangean Arch., Gelaman, swampy edge of ricefield, 20 m: *Backer 27124* (BO); Ardjasa, edge of ricefield, 25 m: *Backer 27364* (BO).

Philippines. Luzon, Prov. of Pangasinan, Labrador, Mt San Isidro: *Fénix 30022* (K, NY, P); Prov. of Bulacan: *Ramos Phil. Pl. 1443* (BM, BO, G, GH, L, P, SING); Prov. of Rizal, Morong: *Ramos BS 1388* (BO, GH, NY, US); Manila: *Loher 766* (K), *Merrill BS 8013* (K, US), *Merrill BS 9799b* (NY). Bohol: *Ramos BS 42938* (P). Leyte, 1½ miles SW of Tacloban: *Glassman 514* (GH). Panay, Capiz Prov., Jamindan: *Ramos & Edaño BS 31001* (BM, P).

New Guinea. NE. New Guinea, Morobe Distr., Bulolo R., 2 miles above Wau, 900 m: *Van Royen 4309* (= *NGF 5891*) (L). New Britain, Gazelle Peninsula: *Lauterbach 348* (BO, L).

41. Fimbristylis alboviridis C. B. Clarke, Fl. Br. Ind. 6, 1893, 638; J. Linn. Soc. 34, 1898, 60. — *F. annua* var. *pluristriata* Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 21, non *F. diphylla* var. *pluristriata* C. B. Clarke.

Clarke based this species on specimens from E. Bengal: *Griffith 6313*, *Jenkins 212*, and *J. D. Hooker 230, 203*. Of these, I choose *Jenkins 212* (K) for the lectotype. Considered to be endemic in Assam, *F. alboviridis* appears to be rather widely distributed in Malaysia. However, it is rare everywhere.

According to Clarke the outermost cells of the nut are arranged in 25—30 longitudinal series on each face. This is neither the case in the specimens determined by Clarke, nor in any of the Malaysian ones. I have always found (12—)16 vertical rows of cells.

Malay Peninsula. Kedah, kp. Naka, 30 m: *Holttum 28411* (SING); Selangor, Jinjang: *Sinclair SF 40131* (BM, BO, L, SING).

Java. W. Java, Djakarta, Kebajoran, grassfield, 30 m: *Backer 33599* (BO); Weltevreden: *Backer s.n.* (BO); Djakarta, near Duri station: *Backer s.n.* (BO). E. Java, Grati near Pasuruan, 10 m: *Backer 7693* (BO, L); G. Semongkrong near Pasuruan, dry field, 25 m: *Backer 24224* (BO); same locality, 50 m: *Van Slooten 2428* (BO, K, L).

Philippines. Luzon, Murcia: *D. F. Merrill 20* (US); Luzon central: *Loher 758* (K; the same number in P is *F. tenuinervia* Kern).

42. Fimbristylis trichophylla Ridl., Fl. Mal. Pen. 5, 1925, 155; Henders., J. Mal. Br. R. As. Soc. 17, 1939, 86.

No less than three species of *Fimbristylis* are peculiar to the limestone rocks of P. Langkawi, viz *F. trichophylla* Ridl., *F. malayana* Ohwi, and *F. calcicola* Kern. Typical *F. trichophylla*, a very slender plant with thread-like stems and leaves hanging over the rocks or decumbent, seems to be restricted to P. Langkawi.

MALAY PENINSULA. Kedah, Langkawi, Telok Apan: *Haniff & Nur 7077* (*type-coll., holotype* in SING) (BM, BO, K, SING); Langkawi, Pulau Dayang, Bunting, tufted in limestone crevices at top of hill, always hanging or decumbent in tresses in soil among limestone-rocks in dry places, 240 m: *Corner SF 37858* (BM, BO, K, L); Langkawi, Pulau Chupau, on ledges of limestone: *Corner s.n.* (SING, K); Langkawi, Selat Panchor, on limestone rocks in open places, 60 m: *Henderson SF 29062* (BO, GH, K, SING).

On several other limestone rocks in the Malay Peninsula, however, there occurs a *Fimbristylis* agreeing in almost every detail with *F. trichophylla*, but remarkable by the erect stems not drooping or decumbent, and the broader and stricter leaves. It may be distinguished as:

F. trichophylla Ridl. var. **erecta** Holttum ex Kern. — *F. sp. prox. F. fusca* Henders., J. Mal. Br. R. As. Soc. 17, 1939, 86.

Culmi erecti, teretes vel obtuse trigoni. Folia rigidiora, 1—1$^1/_2$ mm lata. Inflorescentia amplior, composita vel subdecomposita, rarius simplex, usque ad 20-spiculata. Antherae 1$^1/_2$—2 mm longae.

The Pulu Langkawi specimens of var. *erecta* have densely pubescent stems and leaves, the others are glabrous. Of the specimens cited below *SF 22259* is somewhat doubtful, the spikelets being slightly larger, the nuts broader, and the appendage of the connective smooth.

MALAY PENINSULA. Kedah, Langkawi, Batu Ayam, on limestone screes: *Corner & Nauen SF 37847* (*type-coll., holotype* in SING) (BM, BO, K, L, SING); Gunong Baling: *Corner & Nauen s.n.* (SING). Kelantan, Gua Teja, S. Betis, on dry limestone, 210 m: *Henderson SF 29683* (SING, K). Pahang, summit Gunung Senyum, 480 m: *Henderson SF 22259* (K, SING). Selangor, Bukit Takun, near Kanching, on the limestone rocks, 150 m: *Nur SF 34378* (SING).

43. Fimbristylis rigidula Nees in Wight, Contr. Bot. Ind. 1834, 99; in Hook. J. Bot. Kew Misc. 6, 1854, 29; Steud., Syn. 2, 1855, 116; C. B. Clarke, Fl. Br. Ind. 6, 1893, 640; Philip. J. Sc. 2, 1907, Bot. 95; Ill. Cyp. 1909, t. 42, f. 7—8; Merr., En. Philip. Fl. Pl. 1, 1923, 125, p.p. min. — *F. ferruginea* (non Vahl) Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284, p.p.

The first record for the Philippines is that of Nees (1854), based on *Cuming 1396* (*396* is obviously a misprint). Of the specimens cited by Merrill (1923) I have not seen *Ramos BS 7856*; *MacGregor BS 32233* and *Ramos BS 32811* belong to *F. insignis* Thwaites. Only *MacGregor BS 14226* is true *F. rigidula*. Some additional collections are enumerated below.

PHILIPPINES. Luzon: *Cuming 1396* (BM, FI, G, K); Prov. of Nueva Vizcaya, vicinity of Dupax: *MacGregor BS 14226* (BM, K, L, P); Nueva Ecija, wet open soil near Carranglang: *Merrill 214* (BO). Mindanao, Cotabato Prov., Buayan: *Ramos & Edaño BS 85193* (GH).

44. Fimbristylis semarangensis Ohwi, Blumea 8, 1955, 106, f. 8 — *F. annua* var. *gracilis* Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 160, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 21. p.p.

In the Bogor Herbarium I found another collection of this species, not seen by Ohwi. It agrees in all details with the type, and was also collected on saline soil.

Central Java. Rembang, mudwells Kesongo, low alt.: *Van Steenis 17433* (BO, L).

45. **Fimbristylis griffithii** Boeck., Flora 43, 1860, 241. — *F. aestivalis* var. *glaberrima* Boeck., Linnaea 37, 1871, 11, saltem p.p. — *F. aestivalis* (non Vahl) C. B. Clarke, Fl. Br. Ind. 6, 1893, 637, p.p.; J. Linn. Soc. 34, 1898, 59, p.p.; Ridl., Mat. Fl. Mal. Pen. 3, 1907, 92; Fl. Mal. Pen. 5, 1925, 155. — *F. dichotoma* (non Vahl) Camus, Fl. Gén. I. C. 7, 1912, 102, p.p. — *? F. aestivalis* f. *glabra* Kük., Bot. Jahrb. 59, 1924, 49.

Boeckeler's type specimen (Bengal, leg. *Griffith*) in the Berlin Herbarium got lost during the war. The original description perfectly matching the specimens cited below, I have appointed a neotype: *Griffith 6331* in the Kew Herbarium.

Boeckeler, l. c., compared his specimen with the description of *F. limosa* Poepp. et Kunth ex Kunth, a species unknown to him. Later he annotated the specimen of *F. griffithii, Kamphoevener 2785* in the Copenhagen Herbarium, as follows: "*Fimbristylis (Eufimbr.) aestivalis* (Vahl) *β glaberrima = F. limosa* Poepp. et Kunth." I have not seen the S. American *F. limosa*. It seems, however, very doubtful whether it is conspecific with *F. griffithii*, as Kunth, En. Plant. 2, 1837, 225, ascribes obovate-pyriform often verruculose nuts and purplish leaf-sheaths to it. In Clarke's opinion *F. limosa* might be regarded as a variety of *F. aestivalis*, but it should be borne in mind, that Clarke did not distinguish at all between *F. griffithii* and *F. aestivalis*, two clearly distinct species.

F. aestivalis, occurring in Sumatra, W. and C. Java, N. Celebes, and the Philippines, is unknown from the Malay Peninsula. All specimens of "*F. aestivalis*" cited by Ridley, and all specimens from the Malay Peninsula in the Singapore Herbarium, belong to *F. griffithii*. I have not seen *Ridley 43* from Pahang, cited by Clarke (1898).

F. aestivalis f. *glabra* Kük. was based on *Ledermann 7321* from NE. New Guinea. I have not seen this collection.

Bengal. Calcutta: *Rel. Helfer. 145* (C, L) (possibly wrongly localized).

Birma and Malay Peninsula: *Griffith 6331 (neotype)* (K); Lower Birma, Hlawga Lake, near or in water: *U Thein Lwin 44* (K).

Andamans. S. Andamans, Putalang stream: *Prain's coll. 65* (U); Tenasserim and Andamans: *Helfer 6309* (K, L).

Siam. Lower Siam, Champawn: *Haniff & Nur 4363* (SING).

Indo China. Tonkin, Haïphong, sur le bord des mares: *Balansa 212* (P). Annam, Tourane and vicinity: *Clemens 3546* (P). Cochin China: *Thorel 507* (P); Saigon: *Germain 101* (P), *Lecomte & Finet 2025* (P); Coy Cong: *Pierre s.n.* (P).

Sumatra. Central Sumatra, near Langgan: *Koorders 21430 β* (BO); Djambi, Sipin Lake: *Rutten-Kooistra S 6* (BO, L).

Malay Peninsula: *Griffith 6311* (K); Perak, Kuala Temango: *Ridley s.n.* (SING); Tanjong Malim: *Ridley s.n.* (SING); Sambelong (= Sembilan): *Kamphoevener 2785* (C). Kelantan, Kota Bahru: *Ridley s.n.* (K). Trengganu, Bundi: *Rostados 41* (SING). Pahang: *Ridley 2* (SING), *43* (BM); Bintong: *Burkill & Haniff 16800* (SING); Kuala Pahang: *Ridley s.n.* (SING); Kuala Tambeling: *Ridley s.n.* (SING); Pekan, on sandy roadside: *Burkill & Haniff 17118* (SING); Katapang: *Ridley 1268* (SING); Tasek Bera, on edge of lake: *Henderson SF 24105* (BO ,NY, SING). Malacca: *Alvins 1153* (SING), *Griffith s.n.* (FI). Singapore: *Burkill*

SF 6641 (BO, L, SING), *Cantley 3065* (SING), *Hullett s.n.* (K), *Ridley 1739, s.n.* (SING).

JAVA. W. Java: Tjibinung, low meadows near lake, 90 m: *Van Steenis 3070* (BO, L); Nusagede in Lake of Pendjalu, 720 m: *Koorders 44334 β* (BO, L); Tjipaku: *Boerlage s.n.* (L).

BORNEO: *Barber 88* (K). Sarawak, Tubao: *Beccari PB 3736* (FI, G, K, P); Kapit, Upper Rejang R., riverbanks: *Clemens 21348* (BM, BO, GH, K, L, NY). West Borneo, Pontianak: *Main 1813* (BO), *Moh. Enoh 318* (BO, L). S. and SE. Borneo, Bandjermassin: *Motley 540* (K); Sampit, along river, 5 m: *Buwalda 7902* (BO, L); Hayup: *Hubert Winkler 2557* (BM, BO, K, P, SING). E. and NE. Borneo: Mahakam R. near Melak, riverbank, 40 m: *Posthumus 2044* (BO). Br. N. Borneo: Penampang, wet padi-area, edge of path: *Forster S 4* (K).

CELEBES. Menado, near Taripa, swamp: *Eyma 4029* (BO, L, SING, U); Kendari, Puhara, swampy bank, 50 m: *Kjellberg 738* (BO, L).

MOLUCCAS. W. Ceram, Waesámoe-Telaga Sawáu, 1—2 m: *Eyma 2953* (BO).

W. NEW GUINEA. Prauwen bivouac, riverbank, 60 m: *Lam 891* (BO, K, L, SING); near Prauwen bivouac, in swamp, 90 m: *Lam 1115* (BM, BO, K, L, SING); Bernhard bivouac, 50 m: *Meijer Drees 544* (BO, K, L); Merau R., NE. of Merauke, between Kweel and Un, loamy river bank and in the water, 40 m: *Van Royen 4688* (L); near Bupul, margin of shallow marshy lake, 40 m: *Van Royen 4805* (L).

46. Fimbristylis squarrosa Vahl, En. Plant 2, 1806, 289; Kunth, En. Plant. 2, 1837, 224; Steud., Syn. Plant. Glum. 2, 1855, 110; Boeck., Linnaea 37, 1871, 10; C. B. Clarke, Fl. Br. Ind. 6, 1893, 635; Camus, Fl. Gén. I. C. 7, 1912, 101, f. 16, 3—6.

In Malaysia only:

var. **esquarrosa** Makino, Bot. Mag. Tokyo 17, 1903, 47. — *F. velata* R. Br., Prodr. 1810, 227; Kunth, En. Plant. 2, 1837, 243; Benth., Fl. Austral. 7, 1878, 309. — *F. propinqua* R. Br., Prodr. 1810, 227; Kunth, En. Plant. 2, 1837, 243. — *F. makinoana* Ohwi, J. Jap. Bot. 14, 1938, 578; Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 83.

F. squarrosa is intimately related to *F. aestivalis* (Retz.) Vahl, with which species F. von Mueller, Fragm. Phyt. Austral. 9, 1875, 11, united it. Typical *F. squarrosa* is characterized by the $^1/_2$—1 mm long recurved mucros of the glumes giving the spikelets a squarrose aspect, and by the long pendent hairs of the style-base closely appressed to the nut. In var. *esquarrosa*, however, the mucros are as short as those of *F. aestivalis*, so the long trichomes of the style-base (absent or very short in *F. aestivalis*) remain the only reliable character to distinguish between the two species. The style of *F. squarrosa* is slightly longer and the nut usually somewhat larger than those of *F. aestivalis*, and the plant is usually coarser, but these characters are too trifling to depend on. The length of the mucros being the only difference I can find between *F. squarrosa* and its var. *esquarrosa*, I think the taxonomical value of the latter is over-estimated in giving it specific rank. According to N. Tanaka (see Ohwi, 1944) the chromosome number in *F. squarrosa* is $n = 10$, in var. *esquarrosa* $n = 12$.

The species is new for Malaysia. The collections mentioned by Merrill, En. Philip. Fl. Pl. 1, 1923, 126, belong partly to *F. aestivalis (Merrill 9566, Phil. Pl. 2093)*, partly to *F. merrillii (Fénix BS 26093)*.

The Sumatra and Java plants grew together with *F. aestivalis*.

SUMATRA. Samosir, Toba Lake, near Pangururan, moist sandy locality: *Lörzing 7701, p.p.* (BO, L); Toba Lake, near Balige: *Lörzing 8054* (BO).

JAVA. Res. Priangan, Mt Patuha, Telaga Patengan, marshy meadows at margin of lake, 1600 m: *Van Steenis 7450* (BO, L).

PHILIPPINES. Luzon, Prov. of Cagayan: *Curran FB 16783* (BO, L, US).

47. Fimbristylis gracilenta Hance, J. Bot. London 6, 1868, 89; C. B. Clarke, J. Linn. Soc. Bot. 36, 1903, 237; Camus, Fl. Gén. I. C. 7, 1912, 103. — *F. thorelii* Camus, Not. Syst. 1, 1910, 246; Fl. Gén. I. C. 7, 1912, 105.

New for Malaysia. The distribution of this species is insufficiently known. A survey of all specimens examined is given below.

China. In arenosis graminosis insulae Danorum, Whampoae: *Hance 13227* (BM, *type*; P); Canton: *Sampson 919* (BM).

Indo China. Tonkin, entre Bat-bac et le mont Bavi: *Balansa 2786* (P). Annam, bords du Song-Cau, Lang-Luong (Song-Ca-Lan): *Brousmiche 820* (P). Cochin China: *Pierre s.n.* (P); *Thorel 537* (*type* of *F. thorelii* Camus) (P).

Malaysia. N. Sumatra, between Aek Bila and Aek Marbau, open place in forest, 150 m: *Lörzing 9751* (BO); vicinity of Rantau Parapat, Bila, Sum. E. C.: *Rahmat si Boeea 1721* (NY, US).

48. Fimbristylis spicigera Kern, sp. nov. — *Fig. 8.*

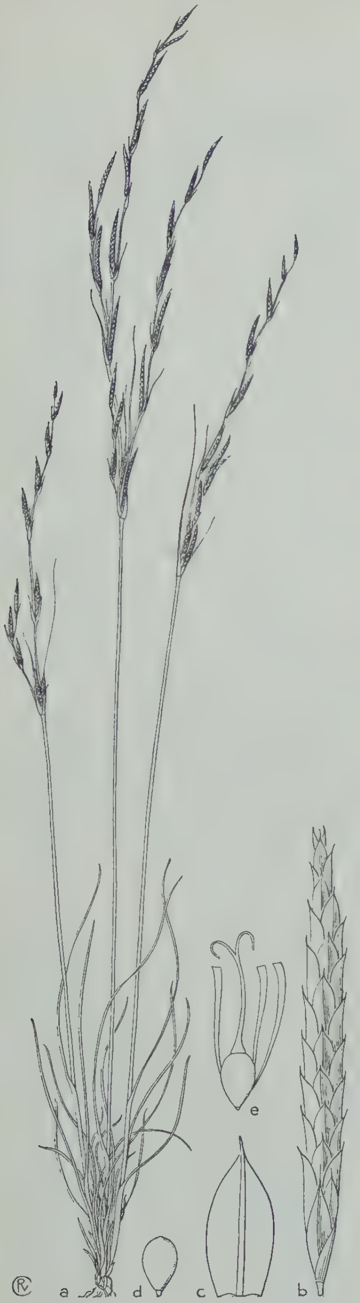
Perennis, omnibus partibus glabra. *Culmi* stricte erecti, rigidi, fasciculati, obtusanguli, sulcati, glabri laevesque, 10—25 cm alti, 1—$1^{1}/_{3}$ mm crassi, ad basin foliati, inferne vaginis 3—5 cm longis cincti. *Folia* culmo 2—3-plo breviora, erecta, capillacea, involuta, supra celluloso-reticulata subtus leviter striata, acuta, ad basin 1 mm apicem versus $^{1}/_{2}$ mm lata, eligulata, marginibus incrassatis apicem versus antrorse scaberulis, vaginis striatis ferrugineis in parte priore membranaceis. *Anthela* stricte erecta, angusta, laxa, 8—20-spiculata, 6—14 cm longa. Bracteae involucrales 2—3, foliis consimiles, quam inflorescentia breviores, erectae, ad basin dilatatam scarioso-marginatae, ima usque ad 9 cm longa. Anthelae radii 2—3, erecti, glabri laevesque, spiciformes. *Spiculae* solitariae, sessiles, erectae, rhachidi adpressae, bracteolis 2 brevibus $^{1}/_{2}$—2 cm longis suffultae, lineares, in sectione transversa rhomboideae, acutae, multiflorae, 10—15 mm longae, 1 mm latae. *Glumae* spiraliter subquadrifariam dispositae, tenuiter membranaceae, erectae, adpressae, oblongo-ovatae vel ellipticae, carinatae, 2—$2^{1}/_{2}$ mm longae, 1—$1^{1}/_{4}$ mm latae, nervo medio prominente in mucronem $^{1}/_{3}$—$^{1}/_{2}$ mm longum desinente, dorso ferrugineo, lateribus hyalinis. *Stamina* (2—)3, antheris oblongis $^{1}/_{3}$ (demum ad $^{1}/_{2}$) mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, compressus, ad basin dilatatus, glaber, 1—$1^{1}/_{4}$ mm longus, stigmatibus 2 quam stylus paullo brevioribus. *Nux* biconvexa, valde compressa, elliptica vel subobovata, breviter stipitata, haud umbonulata, laevis, pallide brunnea, 0.75—0.85 mm longa, 0.45—0.5 mm lata, cellulis extimis minutis rotundis vel ellipticis indistincte reticulata.

Mainly characterized by the inrolled thread-like leaves, the stiffly erect stems, and the very narrow anthela consisting of only 2(—3) erect spike-like branches with appressed spikelets. This peculiar appearance of the inflorescence is caused by the fact that consistently only one of the lateral axes is developed, each subordinate axis seemingly forming a prolongation of the main axis.

This species and the two following ones are related to those of Sect. *Pogonostylis.* They are, however, apparently perennials and in future it may be necessary to accomodate them into a separate section.

Siam. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932, *A. F. G. Kerr 21366* (K, *type*; L).

Indo China. Laos, Luang-Prabang, expédition du Mé-Kong 1866—68: *Thorel*



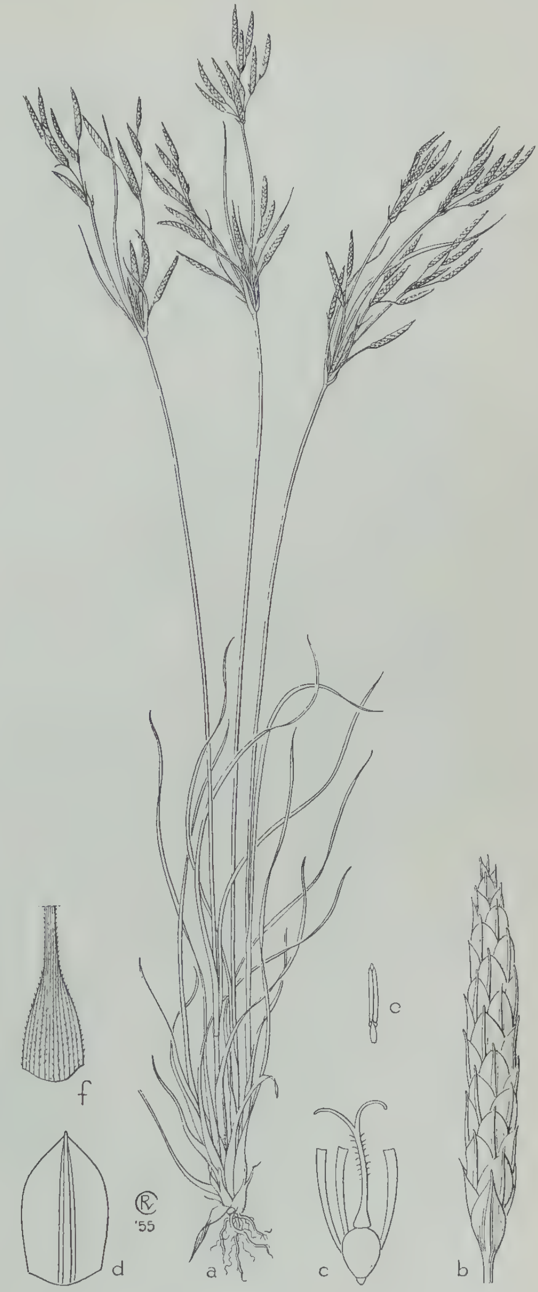


Fig. 8. *Fimbristylis spicigera* Kern — a. Habit, × ½; b. spikelet, × 5; c. glume, × 10; d. nut, × 10; e. deflorate flower, × 10. — From *Kerr 21366* (K).

Fig. 9. *Fimbristylis arenicola* Kern — a. Habit, × ½; b. spikelet, × 5; c. deflorate flower, × 10; d. glume, × 10; e. stamen, × 10; f. base of leaf-blade, × 2½. — From *Kerr 21361* (K).

2901 (L, P); entre Luang-Prabang et Vientiane, avril 1913: *Joseph s.n.* (L, sub no 951.86—265).

49. Fimbristylis arenicola Kern, sp. nov. — *Fig. 9.*

Perennis. *Culmi* erecti, graciles, fasciculati, striato-sulcati, glabri laevesque, 15—25 cm alti, $^2/_3$—1 mm crassi, ad basin foliati, inferne vaginis 3—6 cm longis cincti. *Folia* culmo duplo breviora vel longitudine ei subaequalia, erecta, plana, supra celluloso-reticulata subtus striata, acuta, 1—$1^1/_2$ mm lata, eligulata, sparse puberula, marginibus antrorse scaberulis, vaginis striatis puberulis ferrugineis in parte priore membranaceis. *Anthela* composita vel decomposita, laxa, 20—30-spiculata, 5—10 cm longa, 2—5 cm lata. Bracteae involucrales 3—4, foliis consimiles, inflorescentia breviores vel paene eiusdem longitudinis, erectae, ad basin dilatatam scarioso-marginatae, ima 3—6 cm longa. Anthelae radii 5—8, oblique erecti, glabri laevesque, usque ad 6 cm longi. *Spiculae* solitariae, lineares, angulatae, acutae, multiflorae, ferrugineae, 5—10(—15) mm longae, 1—$1^1/_4$ mm latae. *Glumae* spiraliter dispositae, tenuiter membranaceae, erectae, adpressae, oblongo-ovatae, carinatae, 2 mm longae, 1 mm latae, nervo medio prominente in mucronem $^1/_{10}$—$^1/_5$ mm longum desinente, dorso ferrugineo, lateribus hyalinis. *Stamina* 3, antheris linearibus 0.75—0.85 mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, compressus, ad basin dilatatus, fimbriatus, $1^1/_4$ mm longus, stigmatibus 2 quam stylus brevioribus. *Nux* biconvexa, valde compressa, obovata, breviter stipitata, haud umbonulata, laevis, brunnea, 0.6—0.7 mm longa, 0.45 mm lata, cellulis extimis minutis rotundis vel hexagonalibus indistincte reticulata.

Closely related to the preceding species, but the stems more slender, less rigid, the leaf-blades flat, and hairy like the sheaths, the inflorescence broader, regularly anthelate (the rays not spiciform), the spikelets not rhomboid in cross-section, the mucros shorter, the anthers longer, the style fimbriate, and the nut slightly smaller.

SIAM. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932: *A. F. G. Kerr 21361 (type)* (K).

50. Fimbristylis brunneoides Kern, sp. nov. — *Fig. 10.*

Perennis, omnibus partibus glabra. *Culmi* fasciculati, erecti, graciles, obtusanguli, sulcati, laeves, 5—12 cm alti, $^1/_3$—$^1/_2$ mm crassi, ad basin foliati. *Folia* culminibus subaequilonga, erecta, capillacea, supra celluloso-reticulata, subtus paucinervata, acuta, eligulata, $^1/_3$—$^1/_2$ mm lata, marginibus incrassatis involutis, vaginis ferrugineis in parte priore membranaceis. *Anthela* composita, laxa, angusta, 7—16-spiculata, 5—7 cm longa. Bracteae involucrales 3—4, foliis consimiles, inflorescentia breviores vel paene eiusdem longitudinis, erectae, ad basin dilatatam scarioso-marginatae, ima usque ad 6 cm longa. Anthelae radii 4—5, filiformes, glabri laevesque, usque ad 4 cm longi. *Spiculae* solitariae vel 2—3 aggregatae, erectae, anguste lineares, angulatae, acutae, laxe pluriflorae, 15—25 mm longae, $^3/_4$—1 mm latae. *Glumae* spiraliter dispositae, tenuiter membranaceae, erectae, adpressae, lanceolatae, carinatae, in dorso ferrugineo tenuiter 3—5-nervatae, 3 mm longae, 1—$1^1/_4$ mm latae, nervo medio prominente in mucronem 1 mm longum desinente, lateribus hyalinis. *Stamina* 1—2, antheris linearibus 0.6—0.75 mm longis, connectivo in appendicem brevem glabram producto. *Stylus* compressus, tenuis, ad basin vix dilatatus, glaber, $1^1/_2$—$1^3/_4$ mm

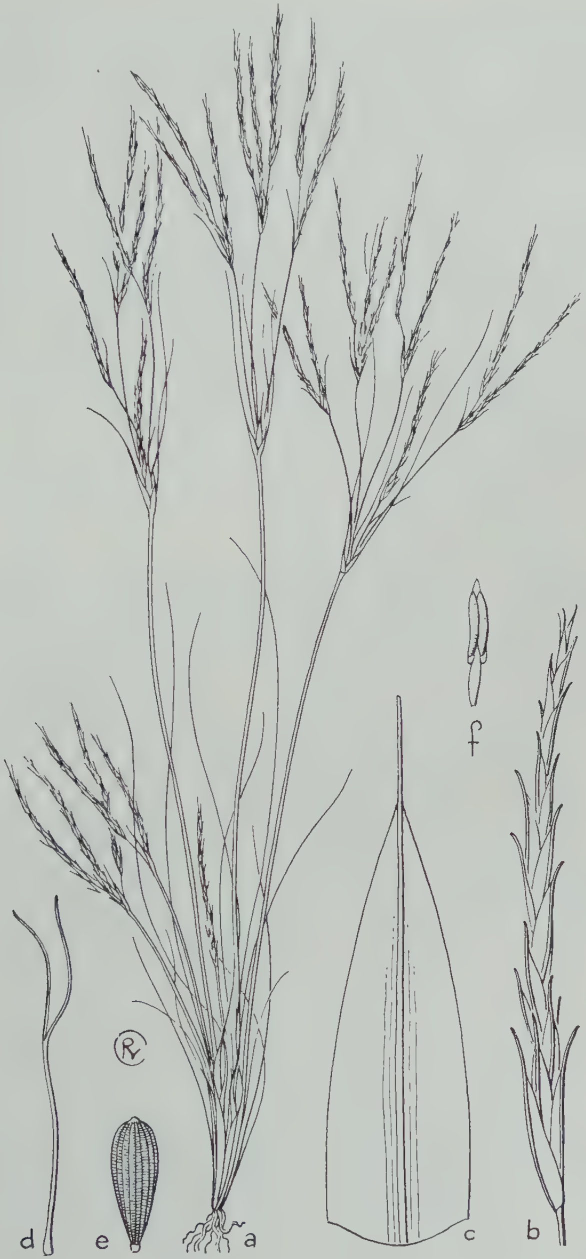


Fig. 10. *Fimbristylis brunneoides* Kern — a. Habit, slightly reduced; b. spikelet, × 4; c. glume, × 17; d. style and stigmas, × 17; e. nut, × 17; f. stamens, × 20. — From *Kerr 21359* (K).

longus, stigmatibus 2 quam stylus paullo brevioribus. *Nux* plano-convexa, compressa, oblongo-obovata, breviter stipitata, haud vel vix umbonulata, fusca, 0.8—0.9 mm longa, 0.3—0.4 mm lata, cellulis extimis impressis transverse oblongo-linearibus, in facie convexa 7—8-serialibus, in facie plana 3—4-serialibus, trabeculata.

The habit is that of *F. brunnea* C. B. Clarke ex E. G. Camus, to which species it is certainly closely allied; it differs by the compound inflorescence, the somewhat narrower spikelets, the longer glumes with longer mucros, the longer style and anthers, and the very narrow nut. In *F. brunnea* the anthela is simple, consisting of 3—5 almost sessile digitately arranged spikelets, the glumes are c. $2^{1}/_{2}$ mm long with a mucro $^{1}/_{2}$—$^{3}/_{4}$ mm long, the style is 1 mm long, the anthers are oblong only $^{1}/_{3}$ mm long, and the nut is more obovate, (0.4—)0.5 mm wide. Whereas in the allied *F. spicigera* and *F. arenicola* the nuts are smooth with roundish to elliptic not impressed outer cells, they are distinctly trabeculate by the transversely oblong-linear impressed outer cells both in *F. brunnea* and *F. brunneoides*.

SIAM. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932: *A. F. G. Kerr 21359 (type)* (K).

51. Fimbristylis acicularis R. Br., Prodr. 1810, 226; Benth., Fl. Austral. 7, 1878, 301. — *Gramen polytrichum* Rumph., Herb. Amb. 6, 1750, 17, t. 7, f. 1. — *F. setacea* Benth. in Hook. Lond. J. Bot. 2, 1843, 239; Steud., Syn. Plant. Glum. 2, 1855, 106; C. B. Clarke, Fl. Br. Ind. 6, 1893, 632, p.p.; Philip. J. Sc. 2, Bot., 1907, 91; Koord., Exk. Fl. Java 1, 1911, 198; Valck. Sur., Nova Guinea 8, 1912, 702; Merr., En. Philip. Fl. Pl. 1, 1923, 126; S. T. Blake, J. Arn. Arb. 35, 1954, 208. — *F. acuminata* var. *pumila* Nees in Hook. J. Bot. Kew Misc. 6, 1854, 29. — *Abildgaardia brevifolia* Steud., Syn. Plant. Glum. 2, 1855, 72; Miq., Fl. Ind. Bat. 3, 1856, 297. — *Isolepis cochleata* Steud., Syn. 2, 1855, 100. — *F. acuminata* var. *setacea* (Benth.) Miq., Fl. Ind. Bat. 3, 1856, 314; Benth., Fl. Austral. 7, 1878, 301; Kük., Bot. Jahrb. 59, 1924, 47; ibid. 69, 1938, 257. — *F. acuminata* var. *minor* Nees ex Boeck., Linnaea 37, 1871, 4; Rolfe, J. Bot. 24, 1886, 59, in nota (sphalm. "*F. acutifolia* var. *minor*"). — *F. bursifolia* (sphalm.) Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284. — *F. setacea* var. *brevifolia* (Steud.) C. B. Clarke, Fl. Br. Ind. 6, 1893, 632.

There is much confusion about this species, both with regard to its distribution and nomenclatorial.

Up to the present the Malaysian plants were generally known as *F. setacea* Benth. This binomial was based on a Barclay collection from Ambon in the Kew Herbarium. Bentham was well aware of the fact that his new species "diagnosis *F. acicularis*, Br. paucis verbis differt", and added: "stamina non vidi". In the Flora Australiensis he reduced *F. setacea* to a variety of *F. acuminata* Vahl (which was already done by Miquel in 1856!) and gave the following key (p. 298):

Stamen 1. Style glabrous .... *F. acicularis*
Stamens 3. Style ciliate .... *F. acuminata* (var. *setacea*)

The descriptions in the Flora Australiensis, p. 301 do not give any other difference. In the type-collection of *F. acicularis* in the British Museum the style is distinctly fimbriate in the upper part. It may be remarked that this is quite in accordance with Brown's diagnosis: "stylo basi dilatata nuda". The number of stamens in all specimens of *F. setacea* (also in those of Ambon) is 1 or 2.

I am unable to find any reliable difference between the type collection of *F. acicularis* R. Br. and that of *F. setacea* Benth. The two binomials appear to be synonymous, and *F. acicularis* is the correct name.

According to Blake, the correct trinomial of this plant, if treated as a variety of *F. acuminata*, would be *F. acuminata* var. *minor* Miq. However, Miquel did not make this combination; the mistake goes back to Clarke (1893). The correct varietal name would be *F. acuminata* var. *pumila* Nees (1854), based on *Cuming 675*, "culmo capillari caryopsi duplo minore." In my opinion *F. acicularis* undoubtedly deserves specific rank; it should not be treated as a variety of *F. acuminata* Vahl, even less referred to the synonymy of the latter species, as was done by Clarke (Fl. Br. Ind. 6, 1893, 631). The type of *F. acuminata* Vahl (C!) represents a clearly distinct species, widely distributed in SE. Asia.

Clarke (1893) gives the distribution of "*F. setacea*" as follows: S. Burma, *Kurz*, Singapore, *Kurz*, *Ridley*; Amboyna, N. Australia. The Birma and Singapore collections cited represent dwarfish specimens of *F. acuminata*. This is also the case with *Ridley 107*, *10011* (wrongly as *1011*), and *10829*, cited by Ridley as *F. setacea*, and with all records in the Flora of the Malay Peninsula.

I have never seen *F. acicularis* from the Western part of Malaysia nor from the Asiatic continent. The species extends from N. Australia through New Guinea, the Moluccas, and Celebes to the Philippines.

PHILIPPINES. Luzon, Kias, Prov. Benguet: *Williams 1968* (NY); Camp Stotsenburg (Mt Pinatubo), Pampanga Prov.: *Elmer 22358* (BM, BO, C; G, GH, K, L, NY, P, SING); Angat, Prov. of Bulacan: *Ramos BS 21740* (BO, GH, P, SING); Manila: *Barthe s.n.* (P); Prov. of Rizal: *Ahern's coll. FB 3390* (BO, K, NY, US); Prov. Lagora, *Cuming 675* (*type-coll.* of *Abildgaardia brevifolia* Steud., *F. acuminata var. pumila* Nees, and *F. acuminata* var. *minor* Boeck.) (BM, C, FI, G, GH, K, L); Mt Mayon, Albay Prov.: *Robinson BS 6450* (P); Mayon Volcano, Albay Prov., secondary forest partly open along trail: *Mendoza PNH 18357* (L).

CELEBES. Makassar, kp. Sambungdjawa: *Noerkas (exp. v. Vuuren) 33* (BO, L).

MOLUCCAS. Halmaheira, Mt Dukono, W. Tobelo, crater field: *Beguin 2312* (BO). Buru, Wai Eken-Kabut, swampy *Imperata* field, 250 m; *Toxopeus 516* (BO). Ambon: *d'Urville s.n.* (P); *Barclay s.n.* (*type* of *F. setacea* Benth.) (K); *Robinson Pl. Rumph. Amb. 438* (BM, BO, GH, K, L, NY, P, SING); Waai, beach: *Rant 619* (BO, L).

NEW GUINEA. W. New Guinea, ora australis: *Koch* (L, 909.90—40). Papua, Western Division, Lake Daviumbu, Middle Fly R., savannahs, abundant on hard-pans and swamp margins: *Brass 7531 A* (GH, U); Daru Island, abundant in flattened tufts on damp soil in savannah-forests: *Brass 6245* (GH). NE. New Guinea, Ramu R.: *Schlechter 13879* (BO); between Malolo-Mission and Salamaua: *Clemens 4297* (GH); Samboga River, near Buna: *Baim s.n.* (BO). Aru Islands, P. Trangan, savannah: *Buwalda 5357* (BO, L).

AUSTRALIA. Endeavour River, 1770: *Banks & Solander (type)* (BM).

Sine loco: *d'Urville s.n.* (*type* of *Isolepis cochleata* Steud.) (P).

II. KEY TO THE MALAYSIAN SPECIES OF FIMBRISTYLIS

1a. Spikelets terete or angular, not strongly laterally compressed. Glumes spiral throughout 2

b. Spikelets strongly laterally compressed. Glumes (at least in young spikelets) distichous, the distichous arrangement in mature spikelets sometimes less pronounced by torsion of the rhachilla 73

2a. Nut oblong-linear in outline (with almost parallel sides), subcylindrical, hardly compressed 3

b. Nut orbicular, obovate, oblong-obovate, pyriform, or turbinate, biconvex or 3-sided 4

3a. Leaves reduced to bladeless sheaths. Stems terminated by a single spikelet, 10—60 cm tall. Spikelet 6—15 × 4—6 mm. Glumes muticous, 4—5 mm long. Nut (without gynophore) $1^{1}/_{2}$—2 mm long, trabeculate; gynophore conspicuous, $^{1}/_{2}$—1 mm long. — *Throughout Malaysia, very local* . . . **F. tetragona** R. Br.

b. Leaves capillary. Stems 2—5 cm tall. Inflorescence usually with several spikelets, rarely reduced to a single one. Spikelets 3—6 × 2—3 mm. Glumes mucronate, the blade about 1 mm long. Nut $^{1}/_{2}$—$^{3}/_{4}$ mm long, obscurely transversely lineolate, sessile or almost so, when young covered with 2 rows of prominent clavate glands. — *Madura, Bawean, E. Borneo, Philippines, C. Celebes, Papua* **F. dipsacea** (Rottb.) C. B. Clarke

4a. Stigmas 3 (rarely in a few flowers 2). Nut trigonous of triquetrous, if dorsoventrally compressed with a raised, dorsal angle 5

b. Stigmas 2. Nut strongly dorsoventrally compressed, 2-sided, biconvex or planoconvex 40

5a. Glumes with long-ciliate margins 6

b. Glumes not (or only microscopically) ciliate 11

6a. Stems terminated by a single spikelet 8—20 × 5—6 mm. Stem scabrous. Glumes 5—7 × $3^{1}/_{2}$—4 mm. Nut about $1^{1}/_{2}$ mm long and wide, pyriform. Leaves 2—3 mm wide. — *Papua* . . . . **F. recta** F. M. Bail.

b. Spikelets often more than 1, always much smaller. Stem smooth or only slightly scaberulous. Glumes and nuts smaller 7

7a. Nut turbinate, often slightly depressed at the apex, with about 10 transverse wrinkles, about 1 × 1 mm. Leaves setaceous, hispidulous. Spikelets 1—5 to the stem. Glumes densely short-pubescent, with strong midnerve. — *Wetar, Luzon* **F. hispidula** (Vahl) Kunth

b. Nut neither turbinate nor transversely wrinkled, smooth or verruculose, smaller. Leaves glabrous. Spikelets usually 3 or more to the stem 8

8a. Glumes not gland-dotted. Stems 10—30 (—50) cm tall, the base clothed with 2—3 bladeless sheaths. Leaves $1^{1}/_{2}$—4 mm wide. Inflorescence with 4—25 spikelets. Spikelets 4—8 × 2 mm. Glumes $2^{1}/_{4}$—3 × 2 mm. Nut purplish black, 0.6—0.7 × 0.4—0.5 mm. — *New Guinea, Aru Islands* . . . **F. furva** R. Br.

b. Glumes densely gland-dotted 9

9a. Cauline leaves not reduced to bladeless sheaths. Spikelets in clusters, 2—3 mm long, dark brown. Glumes $1^{1}/_{4}$—$1^{1}/_{2}$ mm long. Anthers $^{1}/_{2}$—$^{2}/_{3}$ mm long, with smooth connective. Style $^{1}/_{2}$—$^{3}/_{4}$ mm long. Nut verruculose, whitish to stramineous, 0.7—0.9 × 0.5—0.7 mm. — *Sumatra, Malay Peninsula, Borneo, Philippines, ? Moluccas* . . . . **F. leptoclada** Benth.

b. Cauline leaves reduced to bladeless sheaths. Spikelets solitary, 5—25 mm long, ferrugineous to fuscous. Glumes 2—$4^{1}/_{2}$ mm long. Anthers 1—$2^{1}/_{2}$ mm long; connective setulose at the top Style 1—4 mm long. Nut blackish . . . 10

10a. Spikelets oblong to linear, 10—25 mm long. Glumes 4—$4^{1}/_{2}$ mm long. Style 3—$3^{3}/_{4}$ mm long. Nut 0.9 mm long. — *SE. Celebes, Aru Islands.* **F. lanceolata** C. B. Clarke

b. Spikelets ovate to oblong, 5—10 mm long. Glumes 2—3 mm long. Style 1—2 mm long. Nut $^{1}/_{2}$—$^{3}/_{4}$ mm long. — *Madura, Luzon, Celebes*. **F. macassarensis** Steud.

11a. Stem terminated by a single spikelet, rarely a lateral one added 12

b. Inflorescence with 3—numerous spikelets 16

12a. Spikelet pseudolateral because of the erect involucral bract as though continuing the stem. Nut truncate and quasi-tridentate at the apex. Leaves setaceous. — *NE. New Guinea* (not seen) . . . . **F. fenestrata** Kük.

b. Spikelets exactly terminal. Nut neither truncate nor quasi-tridentate . . 13

13a. Lower 1—3 (empty) glumes more than half as long as the spikelet, 4—6 mm long 14

b. Lowest glume much shorter than the spikelet, $1^{1}/_{2}$—$2^{2}/_{3}$ mm long 15

14a. Sheaths of the cauline leaves disintegrating in front into fine herringbone-shaped fibres. Spikelet 7—9 × 3 mm. Glumes 1-nerved. Stamens 3; anthers 2—$2^{1}/_{2}$ mm long. Style 3—4 mm long. Nut 1 × 0.7 mm. — *Papua*
F. dictyocolea S. T. Blake

b. Leaf-sheaths not disintegrating into fibres. Spikelet 3—6 × 1—$1^{1}/_{2}$ mm. Glumes several-nerved. Stamens 1—2(—3); anthers $1^{1}/_{4}$—$1^{1}/_{2}$ mm. Style $1^{1}/_{2}$—$2^{1}/_{4}$ mm long. Nut 0.75—0.9 × 0.5—0.6 mm. — *Sumatra and adjacent islands, Malay Peninsula, Borneo, Anambas & Natuna Islands, Moluccas, New Guinea.*
F. pauciflora R. Br.

15a. Cauline leaves reduced to bladeless sheaths. Spikelets 3—4 mm wide. Glumes 2—$2^{2}/_{5}$ mm long. *See 21a.* . . . . **F. globulosa** (Retz.) Kunth

b. Leaves well developed, broadly linear, obtuse, $1^{1}/_{2}$—2 mm wide. Spikelet $1^{1}/_{2}$ mm wide. Glumes $1^{1}/_{2}$ mm long. *See 35a.* . . . **F. obtusata** (C. B. Clarke) Ridl.

16a. Spikelets all or nearly all solitary 17

b. Spikelets clustered, some solitary ones often added 36

17a. Cauline leaves (at least the upper one) reduced to bladeless or shortly apiculate sheaths 18

b. Cauline leaves with well developed blades, or all leaves basal 25

18a. Leaves equitant, laterally compressed, finely striate without prominent midrib, the outer margin thin, the inner margin (see note p. 117) distinctly grooved. Spikelets numerous, 2—5 × $1^{1}/_{2}$—2 mm. Rhachilla wingless. Glumes obtuse, muticous, narrowly hyaline-margined, about $1^{1}/_{2}$ × 1 mm. Stamens 1—2. Nut verruculose, transversely lineolate by the transversely oblong-linear outer cells, about $^{3}/_{5}$—$^{1}/_{3}$ mm. — *Throughout Malaysia* . . . . . **F. miliacea** (L.) Vahl
Spikelets 5—10 × 3 mm. Glumes $2^{1}/_{4}$ × $1^{2}/_{5}$ mm. Stamens 3
var. **macrostachya** Kern

b. Leaves not equitant, dorsoventrally compressed, with prominent midrib and rib-like margins, or all reduced to bladeless sheaths 19

19a. Nut pyriform, coarsely tuberculate, about $1^{1}/_{4}$ × 1 mm. Glumes with about 1 mm long mucro. Spikelets (1—)3—5(—9), oblong to linear-lanceolate, 6—10 × 2 mm. Rhachilla broadly winged. Stamens 2. — *Papua*
F. signata S. T. Blake

b. Nut obovate, smooth or verruculose, smaller. Glumes muticous or minutely apiculate 20

20a. Stems obtusangular, not deeply grooved 21

b. Stems acutangular, deeply grooved 22

21a. All leaves of the flowering stems reduced to bladeless sheaths. Spikelets 1—numerous, globose, 3—4 mm wide. Rhachilla narrowly winged. Glumes 2—$2^{2}/_{3}$ mm long, muticous, the midnerve ending somewhat below the apex. Stamens 2—3. Nut verruculose, with transversely oblong outer cells in 12—15 vertical rows on each face, 0.75—1 × 0.6—0.8 mm. Stigmas often 2, and then nut biconvex (see 46a). — *Throughout Malaysia* . **F. globulosa** (Retz.) Kunth

b. Only the upper 1—2 leaves of the flowering stems reduced to bladeless sheaths. Spikelets numerous, lanceolate, $1^{1}/_{4}$ mm wide. Rhachilla broadly winged. Glumes about 2 mm long, apiculate by the midnerve ending in the apex. Stamens 3. Nut densely verruculose, 0.6—0.7 × 0.5 mm; outer cells transversely elliptic. — *Central Java* . . . . **F. subdura** Ohwi

22a. Nut obovate, densely verruculose; outer cells transversely linear, in 4—6 vertical rows on each face 23

b. Nut broadly obovate, smooth or very sparsely verruculose; outer cells transversely elliptic to oblong, in 9—11 vertical rows on each face 24

23a. Annual, flaccid. Flowering stems with well developed basal leaves. Spikelets angular, $1^{1}/_{4}$—$1^{1}/_{2}$ mm wide. Glumes rather prominently keeled, apiculate by the

shortly excurrent midnerve, about 1 mm long. Stamen 1. Nut very obtusely trigonous, 0.4—0.5(—0.7) × 0.3—0.4(—0.5) mm. — *Almost throughout Malaysia*
F. quinquangularis (Vahl) Kunth

b. Perennial, rhizomatous, stiff. Leaves of the flowering stems all reduced to bladeless sheaths. Spikelets terete, $1^{1}/_{2}$—2 mm wide. Glumes hardly keeled, muticous, about $1^{1}/_{2}$ mm long. Stamens 1—2. Nut obtusely trigonous, 0.7—0.75 × 0.4—0.5 mm. — *Sumatra, Java, ?Philippines* . . . . . . **F. aphylla** Steud.

24a. Inflorescence 2—4 cm long, rarely longer. Involucral bracts very short, up to $1^{1}/_{2}$ cm long. Spikelets elliptic, 3—4 × 2 mm. Glumes 2 mm long. Stamens (2—)3; anthers $^{3}/_{4}$—1 mm long. Style 1 mm long. Nut 0.8—0.9 × 0.6—0.7 mm. *Sumatra, Philippines, Celebes, New Guinea* . . . **F. salbundia** (Nees) Kunth

b. Inflorescence 12—20 cm long, rarely shorter. Lower involucral bracts 4—8 cm long. Spikelets ovate, 2—3 × 1—$1^{1}/_{2}$ mm. Glumes $1^{1}/_{2}$—$1^{3}/_{4}$ mm long. Stamens 1—2; anthers $^{1}/_{3}$—$^{2}/_{5}$ mm long. Style $^{2}/_{3}$—$^{3}/_{4}$ mm long. Nut 0.6—0.75 × 0.6 mm. — *Central Java, Celebes* . . . . **F. anisoclada** Ohwi

25a. Ligule a dense fringe of short hairs 26

b. Ligule absent; leaf-sheaths on the inner side gradually passing into the blades 30

26a. Stems obtusely trigonous, slightly compressed. Spikelets 2—$2^{1}/_{2}$ mm wide. Glumes 3—4 mm long, 7—9-nerved. Nut $1^{1}/_{4}$—$1^{1}/_{2}$ mm long, verrucose. Leaves rigid, 2—4 mm wide. Stamens 3; anthers $1^{1}/_{2}$ mm long. Style abruptly thickened at the base, $1^{3}/_{4}$—2 mm long. — *N. and C. Sumatra, Malay Peninsula, Philippines*
F. thomsonii Boeck.

b. Stems strongly compressed, ancipitous. Spikelets 1—2 mm wide. Glumes 1—3 mm long, 3-nerved. Nut usually shorter than 1 mm (only in *F. consanguinea* with smooth nuts 1—1.2 mm) 27

27a. Spikelets very small, about 1 mm wide. Glumes 1 mm long. Style $^{1}/_{2}$ mm long. Nut 0.5—0.6 × 0.3—0.4 mm, finely lineolate by the transversely linear-oblong outer cells superposed in 4—6 vertical rows on each face. Leaves flaccid, 1—2 mm wide. Stamen 1; anther $^{1}/_{4}$ mm long. — *E. Java, Philippines, New Guinea*
F. microcarya F. v. M.

b. Spikelets larger, $1^{1}/_{2}$—2 mm wide. Glumes 2—3 mm long. Style 1—2 mm long. Nut $^{3}/_{4}$—$1^{1}/_{5}$ × $^{1}/_{2}$—$^{3}/_{4}$ mm 28

28a. Stems and leaves very narrow, $^{1}/_{3}$—$^{1}/_{2}$ mm wide. Margins of the glumes hardly hyaline. Anthers $^{1}/_{2}$ mm long. Style $1^{1}/_{2}$ mm long. Nut smooth, 0.8 × 0.7 mm; outer cells transversely elliptic. — *W. New Guinea* . . **F. capilliculmis** Ohwi

b. Stems 1—4 mm wide, leaves 1—5 mm wide. Margins of the glumes whitish hyaline. Anthers 1—$1^{1}/_{2}$ mm long 29

29a. Inflorescence compound or decompound, with many spikelets. Leaf-sheaths compressed, sharply keeled on the back; leaf-blades 3—5 mm wide. Stems 2—4 mm wide. Glumes 2—$2^{1}/_{2}$ mm long. Anthers about 1 mm long. Style 1—$1^{1}/_{4}$ mm long. Nut verruculose, 0.7—0.8 mm long. — *Throughout Malaysia, 0—1000 m alt.*
F. complanata (Retz.) Link

b. Inflorescence subsimple, with few spikelets. Leaf-sheaths hardly compressed, rounded on the back; leaf-blades 1—2 mm wide. Stems 1—$1^{1}/_{2}$ mm wide. Glumes $2^{1}/_{2}$—3 mm long. Anthers about $1^{1}/_{2}$ mm long. Style $1^{3}/_{4}$—$2^{1}/_{4}$ mm long. Nut smooth, 1—1.2 × 0.75 mm. — *Java, 1600—2300 m alt.*
F. consanguinea Kunth

30a. Spikelets 2—4 mm wide. Style 2—5 mm long 31

b. Spikelets 1—2 mm wide. Style $^{1}/_{2}$—$1^{1}/_{2}$ mm long 33

31a. Stems solitary on the creeping rhizome. Glumes muticous, castaneous, $4^{1}/_{2}$—6 × $3^{1}/_{2}$ mm. Leaves rigid, 1—2 mm wide. Spikelets 7—15 × 3—4 mm. Anthers 2—$2^{1}/_{2}$ mm long. Nut broadly obovate, verruculose, 1—$1^{1}/_{5}$ × 1 mm. — *Philippines*
F. pierotii Miq.

b. Stems tufted on the very short, not creeping rhizome. Glumes apiculate or mucronulate, stramineous to brown 32

32a. Glumes spiral throughout, $4^{1}/_{2}$—6 × 3—$4^{1}/_{2}$ mm. Style $3^{1}/_{2}$—5 mm long; stigmas shorter than the style. Leaves rigid, (1—)2—4 mm wide. Nut obovate, more or less verruculose, 1—1.25 × 0.9—1 mm. — *Malay Peninsula, Borneo, Philippines, Celebes, New Guinea* . . . . **F. insignis** Thwaites

b. Glumes at least in some spikelets distichous or subdistichous. Style 2—2$^{1}/_{2}$ mm, stigmas about as long. Nut 0.8—1 × 0.6—0.75 mm. *See 79a.*
F. eragrostis (Nees) Hance

33a. Stems strongly compressed, ancipitous in the upper half. Leaves 4—7 mm wide. Lowest involucral bract overtopping the inflorescence. External cells of the nut transversely oblong-linear. Glumes acute or apiculate, 1$^{1}/_{2}$—2 × 1$^{1}/_{2}$ mm. Anthers $^{3}/_{4}$—1 mm long. Style $^{3}/_{4}$—1 mm long. Nut finely transversely lineolate by the oblong-linear outer cells, 0.7—0.9 × 0.5—0.6 mm. — *Sumatra, Malay Peninsula, W. and C. Java, Borneo* . . . . **F. dura** (Zoll. et Mor.) Merr.

b. Stems not or only slightly compressed, not ancipitous. Leaves at most 3 mm wide. Lowest involucral bract much shorter than the inflorescence. External cells of the nut roundish to transversely elliptic 34

34a. Leaves stiff, coriaceous. Glumes muticuous, 1$^{1}/_{2}$—2$^{1}/_{4}$ × 1$^{1}/_{4}$—1$^{3}/_{4}$ mm, the midnerve evanescent below the apex. Nut blackish, 0.65—0.8 × 0.5—0.7 mm. Spikelets slightly angular, 3—6 × 2 mm. Anthers $^{3}/_{4}$—1 mm. Style $^{1}/_{2}$—1 mm; stigmas in Malaysia usually 2, rarely 3. — *Throughout Malaysia* **F. cymosa** R. Br.

b. Leaves weak, grass-like. Midnerve of the glumes ending in the apex or slightly excurrent. Nut whitish to stramineous 35

35a. Annual with stems 5—15 cm tall. Leaves 1$^{1}/_{2}$—2$^{1}/_{2}$ mm wide. Inflorescence simple or subcompound, with (1—)3—4 spikelets. Spikelets 4—8 × 1$^{1}/_{4}$—1$^{1}/_{2}$ mm. Glumes broadly ovate, about 1$^{1}/_{2}$ mm long and wide. Style $^{3}/_{4}$ mm long. Nut densely verruculose, 0.6—0.75 × 0.5—0.6 mm. — *Malay Peninsula, Borneo*
F. obtusata (C. B. Clarke) Ridl.

b. Perennial with stems 40—50 cm tall. Leaves 2$^{1}/_{2}$—3 mm wide. Inflorescence decompound or supradecompound, with numerous spikelets. *See 21b.*
F. subdura Ohwi

36a. Small annual with setaceous 10—25 cm tall stems and very narrow (about 1 mm wide) leaves. Inflorescence a single hemispherical head. Glumes mucronate from the sinus of the bilobed apex. Nut 0.6—0.75 × 0.45—0.65 m. — *Lesser Sunda Islands* . . . . **F. schultzii** Boeck.

b. Perennials with stouter stems and broader leaves. Inflorescence with well developed rays and several clusters of spikelets, rarely almost capitate. Glumes muticous, or mucronulate from the apex 37

37a. Leaves densely silky pubescent on the under side. Glumes pubescent. *See 69a.*
F. sericea R. Br.

b. Leaves and glumes glabrous 38

38a. Spikelets 5—15 × 3—4 mm. Glumes 3$^{1}/_{2}$—5 × 2$^{1}/_{4}$—4 mm. Style 2$^{1}/_{2}$—3 mm long. Leaves rigid (2—)3—5 mm wide. Nut verruculose to nearly smooth, about 1 × 1 mm. — *Malay Peninsula* . . . . . **F. nigrobrunnea** Thwaites

b. Spikelets and glumes smaller. Style shorter 39

39a. Nut whitish to stramineous, 0.85—1 × 0.7—0.85 mm. Connective of the anthers distinctly produced, setulose at the top. Glumes with conspicuous scarious margins, triangular-ovate, acute or minutely apiculate, 2—2$^{3}/_{4}$ × 2—2$^{1}/_{2}$ mm. — *Philippines, New Guinea, New Britain* . . . . **F. falcata** (Vahl) Kunth

b. Nut blackish, 0.65—0.8 × 0.5—0.7 mm. Connective shortly produced, smooth. *See 34a.* . . . . **F. cymosa** R. Br.

40a. Nut coarsely rugulose by transverse wavy ridges. Stems with a single terminal spikelet only. Leaves reduced to bladeless or very shortly laminate sheaths 41

b. Nut smooth, verruculose, or trabeculate (i. e. with several longitudinal ribs connected by numerous crossbars), but not coarsely rugulose 43

41a. Spikelets broadly ovate, obtuse to rather acute, usually more or less inclined, 3—5 mm wide. Style tongue-shaped, 0.5—0.7 mm broad. Nut with 3—5 transverse ridges, 1$^{1}/_{4}$—1$^{1}/_{2}$ × 1—1$^{1}/_{4}$ mm. Glumes 3$^{1}/_{2}$—4$^{1}/_{2}$ × 3—3$^{1}/_{2}$ mm. Stamens 3; anthers 1$^{1}/_{2}$—2 mm long. — *Sumatra, Malay Peninsula, Borneo, New Guinea*
F. nutans (Retz.) Vahl

b. Spikelets lanceolate or oblong-ovate, acuminate or very acute, erect, 2—3$^{1}/_{2}$ mm wide. Style less than $^{1}/_{2}$ mm wide. Nut with 5—8 transverse ridges . . . 42

42a. Spikelets 6—12 × 2—3$^{1}/_{2}$ mm. Glumes 3$^{1}/_{2}$—4$^{1}/_{2}$ × 2$^{1}/_{4}$—4 mm, stramineous to brownish. Stamens 2—3; anthers $^{3}/_{4}$—1$^{1}/_{4}$ mm long. Nut broadly obovate to orbicular, 1$^{1}/_{4}$—1$^{3}/_{4}$ mm long and wide, dirty stramineous to brownish. —

Sumatra and adjacent islands, Malay Peninsula, Java, Madura, Lesser Sunda Islands (Tenimbar), Borneo, Philippines . . . . **F. acuminata** Vahl

b. Spikelets 4—6 × 1—2 mm. Glumes $2^{1}/_{2}$—$3^{1}/_{4}$ × 1—2 mm, paler. Stamens 1—2; anthers about $1^{1}/_{2}$ mm long. Nut obovate, 0.75—0.9(—1) × 0.55—0.65(—0.8) mm, white to pale stramineous. — *Philippines, Celebes, Moluccas, New Guinea* **F. acicularis** R. Br.

43a. Stems strongly flattened, ancipitous. Rhachilla broadly winged. Leaves 3—5 mm wide; ligule absent. Inflorescence supradecompound. Lowest involucral bract as long as or longer than the inflorescence. Spikelets 4—7(—12) × 2—$2^{1}/_{2}$ mm. Glumes spiral to subdistichous, 2—$2^{3}/_{4}$ × $1^{1}/_{2}$ mm. Stamens 3; anthers $^{3}/_{4}$—1 mm. Nut obovate or broadly obovate, smooth or sparsely verruculose, 0.75—0.8 × 0.55—0.75 mm. — *S. Sumatra, W. Java, Borneo* . . . . **F. scaberrima** Nees

b. Stems not ancipitous. Rhachilla not or only narrowly winged 44

44a. Glumes ovate-oblong or oblong-lanceolate, more than twice as long as broad. Stems usually terminated by a single spikelet 45

b. Glumes ovate to orbicular, less than twice as long as broad 46

45a. Leaves setaceous, $^{1}/_{2}$—1 mm wide. Spikelets 1(—3) to the stem, ovate-ellipsoid to oblong, terete, 5—15 × 2—3 mm. Glumes muticous, hardly keeled, $2^{1}/_{2}$—3 × 1—$1^{1}/_{3}$ mm. Stamens 1—2; anthers 0.8—1 mm long. Style 1 mm long. Nut cuneate-obovate, rounded at the apex, smooth or sparsely verruculose, 0.8—1 × 0.5—0.6 mm, greyish brown. — *Malay Peninsula, Sumatra, Java, Madura, Philippines* **F. polytrichoides** (Retz.) R. Br.

b. Leaves capillary, $^{1}/_{4}$—$^{1}/_{3}$ mm wide. Spikelet 1 to the stem, oblanceolate or narrowly oblong, angular, 5—7 × 2 mm. Glumes mucronulate, sharply keeled, about 3 × 1 mm. Stamens 1—3; anthers 1—$1^{1}/_{2}$ mm long. Nut narrowly obovate, umbonulate, smooth, 0.7—0.8 × 0.5 mm, whitish. — *Celebes* **F. celebica** Ohwi

46a. Base of the stems clothed with bladeless subinflated sheaths. Spikelets globose, solitary, 3—4 mm wide. Glumes muticous. Nut verruculose with transversely oblong outer cells in 12—15 vertical rows on each face. *See 21a.* **F. globulosa** (Retz.) Kunth

b. Blades of the cauline leaves well developed, rarely the upper one very short, or all leaves basal. Other characters not united 47

47a. Ligule a fringe of short hairs, sometimes membranous 48

b. Ligule absent; leaf-sheaths on the inner side gradually passing into the blades 61

48a. Glumes hairy, at least in the apical part 49

b. Glumes glabrous 50

49a. Lower sheaths coriaceous, shining brown to castaneous, upper ones ciliolate at the mouth, otherwise glabrous. Blades of the cauline leaves rigid, short, 2—10 cm long, $^{1}/_{2}$—$1^{1}/_{2}$ mm wide. Involucral bracts usually shorter than the inflorescence. Spikelets acute. Glumes ovate to oblong, 3—$4^{1}/_{2}$ × $2^{1}/_{2}$—3 mm, puberulous in the apical part, ferrugineous. Style 0.25 mm wide. Nut obovate to oblong-obovate, shortly stipitate, 1—$1^{1}/_{4}$ × $^{3}/_{4}$—1 mm. — *Throughout Malaysia* **F. ferruginea** (L.) Vahl

b. Lower sheaths not coriaceous, stramineous to ferrugineous, the upper ones pilose especially towards the top, sometimes glabrescent. Blades of the cauline leaves grass-like, up to 35 cm long, $1^{1}/_{2}$—2 mm wide. Lowest involucral bract usually overtopping the inflorescence, up to 10 cm long. Spikelets obtuse. Glumes very broadly ovate, 3—$4^{1}/_{2}$ mm long and wide, densely tomentose in the apical part, usually castaneous. Style about 0.4 mm wide. Nut broadly obovate to orbicular, distinctly stipitate, $1^{1}/_{4}$—$1^{1}/_{2}$ × $1^{1}/_{10}$—$1^{1}/_{4}$ mm. — *Lesser Sunda Islands (Timor), Philippines (Mindanao)* . . . . **F. sieberiana** Kunth

50a. Nut smooth, distinctly stipitate by the conspicuous gynophore $^{1}/_{2}$—$^{3}/_{4}$ mm long. Glumes many-nerved. Stamens 3 51

b. Nut trabeculate, usually shortly stipitate, only in *F. podocarpa* with a conspicuous gynophore 54

51a. Apex of the nut broadly emarginate by the 0.5—0.8 mm wide style-scar . . 52

b. Apex of the nut rounded or umbonulate, not emarginate 53

52a. Annual (?), stems tufted. Leaves 1—$1^{1}/_{4}$ mm wide. Spikelets 1—3 to the stem, 10—20 × 3—4 mm. Glumes $4^{1}/_{2}$—5 × 4 mm. Anthers 1 mm long. Ovary not winged. Style 2 mm long. Nut $1^1/_2$—2 mm long; style-scar about $^1/_2$ mm wide. — *Java, Luzon* . . . . **F. caesia** Miq.

b. Perennial, stems approximate on the short-creeping rhizome. Spikelet 1 to the stem, 15—35 × 4—5 mm. Glumes 6—7 × $4^1/_2$—5 mm. Anthers $2^1/_2$—3 mm long. Ovary membranously winged. Style $3^1/_2$—4 mm long. Nut 2 mm long; style-scar 0.6—0.8 mm wide. — *Papua* . . . . **F. subalata** Kern

53a. Inflorescence with 1—2(—3) spikelets which are 3—4 mm wide. Glumes very broadly ovate, $2^1/_2$—3 mm long. Anthers $^3/_4$ mm long. Style $1^1/_4$—$1^1/_2$ mm long. — *Sumatra, Malay Peninsula, Java and adjacent islands, Tenimbar, Borneo, Philippines* . . . . **F. schoenoides** (Retz.) Vahl

b. Inflorescence with (1—)3—7(—11) spikelets which are (4—)5—6 mm wide. Glumes broadly ovate, 4—5 mm long. Anthers $1^1/_2$—$2^1/_2$ mm long. Style 3—$3^3/_4$ mm long. — *Throughout Malaysia* . . . . . **F. tristachya** R. Br.

54a. Style glabrous or with a few (3—4) short ciliae at the top only, $^3/_4$—1 mm long. Spikelets $1^1/_2$—2 mm wide. Glumes $1^1/_2$—2 mm long. Nut 0.6—0.9 × 0.5—0.7 mm; outer cells in 5—9 vertical rows on each face. — *Sumatra, Java and adjacent islands, Tenimbar, Philippines, Celebes, New Guinea* . . . **F. merrillii** Kern

b. Style fimbriate at least in the upper half. Other characters not united . . 55

55a. Spikelets 1—$1^1/_2$ mm wide 56

b. Spikelets 2—4 mm wide 57

56a. Spikelets angular. Glumes membranous, sharply keeled, mucronulate, with nerveless sides. Stamen 1; anther $^1/_2$ mm long. Style $^3/_4$—1 mm long. Nut obovate to broadly obovate, 0.6—0.7 × 0.4—0.55 mm; outer cells in 5—9 vertical rows on each face. — *E. Java, ? Borneo, Luzon* . . **F. bisumbellata** (Forsk.) Bub.

b. Spikelets terete. Glumes subchartaceous, hardly keeled, with finely nerved sides. Stamens 3; anthers 1—$1^1/_2$ mm long. Style $1^1/_4$—$1^3/_4$ mm long. Nut narrowly obovate, 0.7—0.9 × 0.5—0.6 mm; outer cells in 4—6 vertical rows on each face. — *Luzon* . . . . **F. tenuinervia** Kern

57a. Nut oblong-obovate, 1.25—1.5 × 0.7—0.9 mm; outer cells in 12—16 vertical rows on each face. Glumes distinctly many-nerved almost over the whole breadth, oblong-obovate, 3—$4^1/_2$ × $1^1/_2$—3 mm. Stamens 3; anthers $1^1/_2$—$1^3/_4$ mm; connective distinctly produced, papillose-setulose at the top. — *Philippines (Golo)*
F. lineatisquama Ohwi

b. Nut obovate, broadly elliptic or almost orbicular, in *F. dichotoma* rarely almost oblong-obovate, but then the outer cells in 5—10 vertical rows on each face. Sides of the glumes nerveless or only faintly nerved 58

58a. Outer cells of the nut in 5—10 (rarely some more) vertical rows on each face. Spikelets 5—10(—20) × $2^1/_2$—3(—5) mm. Glumes very broadly ovate to oblong-obovate, 2—3 (—$4^1/_2$) mm long. Stamens 1—3; anthers $^1/_2$—1(—$1^3/_4$) mm. Style 2—4 mm long. Nut obovate to broadly obovate, with small gynophore. — *Throughout Malaysia* . . . . **F. dichotoma** (L.) Vahl

b. Outer cells of the nut in (12—)15—24 vertical rows on each face. Other characters not united 59

59a. Spikelets ($2^1/_2$—)3—4 mm wide. Glumes with strong midnerve and several obscure lateral nerves, $3^1/_4$—$3^1/_2$ mm long. Stamens 2; anthers about $^3/_4$ mm. Style $1^1/_4$—$1^1/_2$ mm. Nut broadly elliptic to suborbicular, prominently stipitate; gynophore $^1/_3$—$^1/_2$ mm long and wide, 1.1—1.5 × 0.9—1.4 mm; outer cells in 16—24 vertical rows on each face. — *Malay Peninsula, Java, Kangean Arch., Philippines, New Guinea, ? New Britain* . . . . . . **F. podocarpa** Nees

b. Spikelets 2—$2^1/_2$ mm wide. Glumes 2—$2^1/_2$ mm long. Anthers $^1/_3$—$^1/_2$ mm long. Gynophore inconspicuous. Outer cells of the nut in 12—18 vertical rows on each face 60

60a. Inflorescence very loose, 8—15 cm long. Spikelets light brown, 2 mm wide. Stamens 2. Nut broadly elliptic, almost orbicular, 0.75—0.8 × 0.65 mm, not verruculose. — *Moluccas (Ceram), W. New Guinea* . . . . **F. perlaxa** Ohwi

b. Inflorescence loose, 2—7 cm long. Spikelets greyish green, brownish variegated. Stamen 1. Nut obovate, 1—1.2 × 0.75—0.9 mm, verruculose. — *Malay Peninsula, Java, Luzon* . . . . **F. alboviridis** C. B. Clarke

61a. Nut when young covered with 2 rows of prominent clavate glands. Small annual with capillary leaves, squarrose spikelets, and glumes with a recurved awn almost as long as the blade. *See 3b.* . . . . . **F. dipsacea** (Rottb.) C. B. Clarke

b. Nut without clavate glands. Spikelets not or only slightly squarrose, the mucro of the glumes if present much shorter than the blade 62

62a. Spikelets small, 1—$1^{1}/_{2}$ mm wide. Small annuals with thinly membranous glumes 1—2 mm long, 1(—2) anthers, $^{1}/_{2}$—1 mm long style, $^{1}/_{2}$—$^{3}/_{4}$ mm long nut . 63

b. Spikelets larger, 2—4 mm wide. Other characters not united 67

63a. Inflorescence capitate, subglobose or hemispherical, $^{1}/_{2}$—1 cm across. Glumes muticous or apiculate, 1 × 1 mm. Nut suborbicular, about $^{1}/_{2}$ mm long and wide. — *Malay Peninsula* . . . . **F. argentea** (Rottb.) Vahl

b. Inflorescence anthelate, with well developed rays, larger. Glumes mucronulate. Nut elliptic to obovate, usually slightly larger 64

64a. Base of the style with long pendent hairs covering at least the upper half of the nut. — *N. Sumatra, Java, Luzon* **F. squarrosa** Vahl var. **esquarrosa** Makino

b. Base of the style glabrous or with very short, not pendent hairs . . . 65

65a. Glabrous. Leaves 1—2 mm wide. Base of the stem clothed with 1—2 very shortly laminate sheaths. Style glabrous. — *Sumatra, Malay Peninsula, W. Java, Borneo, Celebes, Moluccas, New Guinea* . . . . **F. griffithii** Boeck.

b. More or less hairy. Leaves $^{1}/_{3}$—1 mm wide. Cauline leaves with well developed blades. Style fimbriate, at least at the top 66

66a. Inflorescence loose, 1—5 cm long. Lowest involucral bract somewhat shorter to slightly longer than the inflorescence. Rays of the inflorescence obliquely patent, glabrous. Glumes about $1^{1}/_{2}$ mm long. Style $^{1}/_{2}$—$^{3}/_{4}$ mm long. Nut $^{1}/_{2}$—$^{2}/_{3}$ mm long. — *Sumatra, Java, Philippines, Celebes* . . . **F. aestivalis** (Retz.) Vahl

b. Inflorescence very loose, 3—10 cm long. Lowest involucral bract up to twice as long as the inflorescence. Rays of the inflorescence obliquely erect, densely puberulous. Glumes about 2 mm long. Style 1—$1^{1}/_{4}$ mm long. Nut $^{3}/_{4}$ mm long. — *N. Sumatra* . . . . **F. gracilenta** Hance

67a. Stems terminated by a single spikelet up to 2 cm long and 3—4 mm wide. Glumes mucronulate, 1-nerved, about 5 × 3 mm. Stamens 3; anthers 2 mm long. Style fimbriate in the upper half, 4—$4^{1}/_{2}$ mm long. Nut obtriangular-obovate, verruculose, 1.15—1.2 × 0.85 mm. — *Lesser Sunda Islands (Wetar)* **F. wetarensis** Ohwi

b. Inflorescence with 3—numerous, smaller spikelets 68

68a. Rhizome creeping 69

b. Rhizome not creeping 70

69a. Leaves densely silky pubescent beneath. Spikelets in clusters of 3—6, angular, $2^{1}/_{2}$—3 mm wide. Glumes keeled, pubescent. Connective setulose at the top. Style $1^{1}/_{2}$—$1^{3}/_{4}$ mm long. Nut 1—$1^{1}/_{3}$ × $^{4}/_{5}$—1 mm. — *Malay Peninsula, Banka, Java, Madura, Borneo* . . . . **F. sericea** R. Br.

b. Leaves glabrous or hairy, but not silky-pubescent. Spikelets solitary or a few in twos, terete, 3—4 mm wide. Glumes hardly keeled, glabrous. Connective smooth. Style 2—3 mm long. Nut $1^{1}/_{3}$—$1^{1}/_{2}$ × $1^{1}/_{10}$—$1^{1}/_{4}$ mm. — *Luzon, Mindanao* **F. rigidula** Nees

70a. Leaves rigid, coriaceous. Nut blackish. Involucral bracts very short, much shorter than the inflorescence. *See 34a.* . . . . **F. cymosa** R. Br.

b. Leaves weak, grass-like. Nut white to stramineous, brownish in *F. trichophylla*. Involucral bracts usually overtopping the inflorescence 71

71a. Nut oblong-obovate, 1—1.5 × 0.5—0.65 mm. Anthers with bristly appendage of the connective. Leaves filiform, sometimes up to 1 mm wide. Glumes obscurely many-nerved, $2^{1}/_{2}$—3 × 2—$2^{1}/_{4}$ mm. Stamens 3; anthers 1—$1^{1}/_{2}$ mm long. Style $1^{1}/_{2}$—$2^{1}/_{2}$ mm long. Outer cells of the nut in 10—12 vertical rows on each face. — *Malay Peninsula* . . . . **F. trichophylla** Ridl.

b. Nut obovate to broadly obovate. Connective smooth. Leaves flat, 1—2 mm wide 72

72a. Rays of the inflorescence scaberulous-pilose. Style retrorsely hispidulous at the base. Glumes apiculate by the slightly excurrent midnerve. Outer cells of the nut transversely linear-oblong. — *Lesser Sunda Islands (Sumba)* **F. sumbaensis** Ohwi

b. Rays of the inflorescence smooth. Style with glabrous base. Glumes muticous, midnerve not reaching the apex. Outer cells of the nut roundish to transversely elliptic. — *Central Java* . . . . **F. semarangensis** Ohwi

73a. Stigmas 2. Nut biconvex. *See 43a.* . . . . **F. scaberrima** Nees

b. Stigmas 3. Nut trigonous or triquetrous 74

74a. Spikelets all sessile, congested into a globose head, stellately spreading, falling off as a whole, 5—6 × 1 mm. Leaves reduced to 2—3 bladeless or shortly laminate sheaths. Stamens 3; anthers linear, 2—3 mm long. Style 4—$4^1/_2$ mm long. Nut ellipsoid or obovoid, $1^1/_3$—$1^1/_2$ × 1 mm. *Banka, P. Lingga, Malay Peninsula, Anamba Islands, Philippines (Culion, Busuanga)*
F. thouarsii (Kunth) Merr.

b. Inflorescence anthelate, with distinct rays, or consisting of 1 terminal spikelet only, rarely almost capitate. Rhachilla persistent, glumes acropetally caducous 75

75a. Nut 2—3 × $1^1/_4$—2 mm, coarsely tuberculate. Spikelets 1—2(—3) to the stem, 8—15(—30) × 4—6 mm. Leaves $^2/_3$—1 mm wide. Glumes $4^1/_2$—5 × 4—$4^1/_2$ mm. Style fimbriate almost to the base, 2—4 mm long. — *Throughout Malaysia*
F. monostachyos (L.) Hassk.

b. Nut much smaller, smooth or verruculose. Spikelets usually several to numerous 76

76a. Glumes glabrous and smooth 77

b. Glumes either puberulous-scaberulous by short hairs at least in the apical part, or beset with reddish glands 80

77a. Spikelets clustered, shining dark brown. Leaves (2—)3—5 mm wide. Involucral bracts stiff, erect, the longest 1—$1^1/_2$ cm. Rays of the inflorescence recurved, up to 3 cm long. Glumes $3^1/_2$—5 × $2^1/_4$—4 mm. Stamens 3; anthers $1^1/_2$—2 mm long. Style $2^1/_2$—3 mm long. Nut about 1 × 1 mm. — *Malay Peninsula*
F. nigrobrunnea Thwaites

b. Spikelets solitary 78

78a. Leaves narrow, $^1/_2$—1 mm wide, with long-acuminate setulose tip. Outer leaf-sheaths coriaceous, shining fuscous to purplish. *See 84a.*
F. vanoverberghii Kük.

b. Leaves broader, with rounded, shortly apiculate apex. Outer leaf-sheaths stramineous to light brown 79

79a. Leaves 2—3 mm wide. Spikelets 2—3 mm wide. Glumes 3—4 mm long, mucronulate from the apex. Stamens 3; anthers $1^1/_2$—2 mm long. Style 2—$2^1/_2$ mm long. Nut 0.8—1 × 0.6—0.75 mm. — *Lesser Sunda Islands (Timor), New Guinea, Aru Islands* . . . . **F. eragrostis** (Nees) Hance

b. Leaves $1^1/_2$—2 mm wide. Spikelets $1^1/_2$ mm wide. Glumes $1^1/_2$—2 mm long, minutely apiculate just below the apex. Stamens 2—3; anthers about $^1/_2$ mm long. Style 1—$1^1/_2$ mm long. Nut 0.6—0.7 × 0.35—0.45 mm. — *N. Sumatra*
F. disticha Boeck.

80a. Glumes gland-dotted. Leaves very narrow, less than 1 mm wide . . . 81

b. Glumes hairy. Leaves broader, $1^1/_2$—2 mm wide (except in *F. vanoverberghii*) . 83

81a. Nut smooth, 0.6—0.75 × 0.4—0.5 mm, the outer cells almost isodiametric. Connective produced into a subulate $^1/_4$ mm long appendage. Spikelets 4—6 × 1—$1^1/_2$ mm. Glumes 3—$3^3/_4$ × $1^1/_2$ mm. Anthers 1—$1^1/_4$ mm long. Style glabrous except for the retrorse hairs at the base, $2^1/_2$—$3^1/_2$ mm long. — *Malay Peninsula, Billiton, N. Borneo* . . . . **F. fuscoides** C. B. Clarke

b. Nut verruculose, transversely lineolate by the linear outer cells. Connective only shortly produced 82

82a. Perennial with short-creeping rhizome. Stems 25—50 cm tall. Glumes $2^3/_4$—4 mm long. Stamens 3; anthers 1—2 mm long. Style 3—$3^1/_2$ mm long, shortly hairy at the base. Nut obovate to obovate-elliptic, 0.75—0.9 × 0.4—0.7 mm. — *N. Sumatra, Luzon, New Guinea* . . . . . **F. cinnamometorum** (Vahl) Kunth

b. Annual with fibrous roots. Stems 5—12 cm tall. Glumes $1^1/_2$—2 mm long. Stamen 1; anther about $^1/_2$ mm long. Style 1—$1^1/_4$ mm long, glabrous. Nut oblong-obovate, 0.6—0.75 × 0.25—0.3 mm. — *Kangean Arch.*
F. adenolepis Kern

83a. Glumes 3—6 mm long, anthers $1^1/_4$—2 mm, style $2^1/_2$—$4^1/_2$ mm. Perennials, rarely annuals, with 20—50 cm tall stems 84

b. Glumes $1^1/_2$—3 mm long, anthers $^1/_3$—$^1/_2$ mm, style 1—$1^3/_4$ mm. Annuals with 5—20 cm tall stems 87

84a. Outer leaf-sheaths coriaceous, shining fuscous to purplish. Leaves $^1/_2$—1 mm wide with long-acuminate setulose tip. Stems glabrous or pilose, leaves more or less hispid especially on the under side. Spikelets 5—8 × 2—$2^{1}/_{2}$ mm. Glumes 3—4 × $2^{1}/_{2}$—3 mm, often glabrescent. Style $2^{1}/_{2}$—3 mm long. Nut 1.1 × 0.75—0.8 mm, sparsely verruculose. — *N. Sumatra, Luzon, New Guinea* **F. vanoverberghii** Kük.

b. Outer leaf-sheaths membranous or herbaceous, dull pale green to brownish. Leaves 1—3 mm wide, without setulose tip 85

85a. Nut smooth, 0.65—0.75 × 0.4—0.5 mm. Glumes 3—4 mm long. Stems at the base with 1—2 bladeless or shortly laminate sheaths. Anthers $1^{1}/_{4}$ mm long. Style 3 mm long. — *Malay Peninsula (P. Langkawi)* . . . **F. malayana** Ohwi

b. Nut verruculose, larger. Glumes 4—6 mm long. Style 4—6 mm long . . 86

86a. Perennial. Leaves much shorter than the stem (often scarcely $^{1}/_{4}$ as long), abruptly pointed, (1—)2(—4) mm wide. Inflorescence compound to supra-decompound, up to 10 cm long, with many to numerous spikelets. Nut obovate, densely verruculose, 0.9—1 mm long. — *Sumatra, Malay Peninsula, Java, Philippines, Celebes, Moluccas, New Guinea* . . . . . . **F. fusca** (Nees) C. B. Clarke

b. Annual. Leaves longer, as long as $^{1}/_{2}$—$^{3}/_{4}$ stem, more gradually acuminate. Inflorescence simple (very rarely one of the rays with a short secondary ray), $1^{1}/_{2}$—2 × 2—4 cm, with 3—6 spikelets. Nut oblong-obovate, sparsely verruculose, 1.25 × 0.7 mm. — *Malay Peninsula (P. Penang)* . . **F. fulvescens** Thwaites

87a. Outer cells of the nut transversely oblong-linear. Nut oblong-obovate to ellipsoid, 0.6—0.65 × 0.3—0.35 mm. Spikelets 3—7(—10) × 1—$1^{1}/_{4}$ mm. Glumes $1^{1}/_{2}$—$1^{3}/_{4}$ mm long. Stamens 2. Style 1 mm long. — *Malay Peninsula (P. Langkawi)* **F. calcicola** Kern

b. Outer cells of the nut hexagonal. Nut obovate or broadly obovate, 0.65—0.8 × 0.45—0.6 mm 88

88a. Glumes broadly ovate when opened out, $1^{1}/_{2}$—$1^{3}/_{4}$ mm long. Nut cuneate at the base, not truncate. Stamens 3. Style 1 mm long. — *N. Sumatra, Papua* **F. intonsa** S. T. Blake

b. Glumes ovate-lanceolate, $2^{1}/_{2}$—3 mm long. Nut truncate at the base. Stamens (1—)2. Style $1^{1}/_{2}$—$1^{3}/_{4}$ mm long. — *N. Sumatra, W. and C. Java, Madura, Kangean Arch., N. Borneo, Celebes, New Guinea* **F. fimbristyloides** (F. v. M.) Druce

III. CLASSIFICATION OF THE MALAYSIAN SPECIES OF FIMBRISTYLIS

In outline the arrangement accepted here agrees with that of Ohwi in J. Jap. Bot. 14, 1938, 571. The limits of the subgenera proposed being far from well-marked, I have contented myself with the distinction of a series of sections. It has been attempted to trace all sectional names available and to typify them in such a way, that the old names can be maintained, though generally they encompass a narrower concept than originally accepted by their authors.

Some of the trigynous species tend to digyny (*F. cymosa, F. globulosa, F. sericea*, and to a lesser extent *F. pauciflora*). *F. scaberrima* is digynous throughout; it has been placed next to *F. dura*, to which it shows affinity in almost every respect. Attention is drawn to the taxonomic value of the ligule.

A system not based on the thorough knowledge of all species of the genus will unevitably show shortcomings in many respects. For instance, I am well aware that the insertion of *F. recta* in sect. *Leptocladae* and of *F. wetarensis* in sect. *Neodichelostylis* is highly disputable.

1. Nut orbicular, obovate, oblong-obovate, pyriform, or turbinate, 3-sided or biconvex.
  2\. Stigmas 3; style triquetrous, usually glabrous. Nut trigonous or triquetrous (see above remark).
    3\. Glumes spiral.
      4\. Nut smooth or verruculose.
        5\. Glumes not ciliate.
          6\. Inflorescence anthelate or capitate.
            7\. Cauline leaves with well developed blades.
              8\. Ligule a dense fringe of short hairs. Sect. 1. **Trichelostylis**
              8\. Ligule absent.
                9\. Rather stout perennials . . . . Sect. 2. **Cymosae**
                9\. Small annuals . . . . Sect. 3. **Tenerae**
            7\. Cauline leaves (at least the upper one) reduced to bladeless sheaths . . . . Sect. 4. **Miliaceae**
          6\. Inflorescence consisting of a single terminal spikelet Sect. 5. **Heleocharoides**
        5\. Glumes long-ciliate . . . . Sect. 6. **Leptocladae**
      4\. Nut coarsely tuberculate . . . . Sect. 7. **Signatae**
    3\. Glumes distichous.
      10\. Rhachilla persistent. Glumes acropetally caducous. Inflorescence anthelate or reduced to a single spikelet.
        11\. Nut large, pyriform, tuberculate . . . . Sect. 8. **Abildgaardia**
        11\. Nut small, obovate, smooth or verruculose . . . Sect. 9. **Fuscae**
      10\. Rhachilla caducous; spikelets falling off as a whole. Inflorescence capitate. Leaves reduced to bladeless sheaths Sect. 10. **Actinoschoenus**
  2\. Stigmas 2; style flat, usually fimbriate. Nut biconvex. Glumes spiral.
    12\. Inflorescence anthelate, with many spikelets.
      13\. Ligule a dense fringe of short hairs, or membranous.
        14\. Nut smooth, not trabeculate . . . . Sect. 11. **Dichelostylis**
        14\. Nut trabeculate . . . . Sect. 12. **Fimbristylis**
      13\. Ligule absent.
        15\. Spikelets terete or slightly angular, 2—4 mm wide Sect. 13. **Rigidulae**
        15\. Spikelets angular, 1—$1^1/_2$ mm wide . . . Sect. 14. **Pogonostylis**
    12\. Inflorescence consisting of a single terminal spikelet, rarely 1 or 2 lateral spikelets added.
      16\. Nut not rugulose. Leaf-blades well developed Sect. 15. **Neodichelostylis**
      16\. Nut rugulose by transverse ridges. Leaves reduced to bladeless sheaths Sect. 16. **Nutantes**
1. Nut oblong-cylindrical. Glumes spiral. Stigmas 2(—3).
  17\. Inflorescence consisting of a single spikelet. Spikelet terete. Leaves reduced to bladeless sheaths . . . . Sect. 17. **Mischospora**
  17\. Inflorescence anthelate. Spikelets angular or squarrose. Leaf-blades well developed . . . . Sect. 18. **Dipsaceae**

Sect. 1. **Trichelostylis** (Lestib.) Boeck., Linnaea 37, 1871, 23. — *Trichelostylis* Lestib., Ess. Fam. Cyp. 1819, 40. — *Isolepis* sect. *Trichelostylis* (Lestib.) Endl., Gen. Plant. 1836, 118. — *Fimbristylis* subgen. *Trichelostylis* (Lestib.) A. Gray, Man. Bot., ed. 5, 1867, 567. — Type species: *F. autumnalis* (L.) R. et S. — Malaysian species: 1. *F. thomsonii* Boeck.; 2. *F. complanata* (Retz.) Link; 3. *F. consanguinea* Kunth; 4. *F. capilliculmis* Ohwi; 5. *F. microcarya* F. v. M.

Sect. 2. **Cymosae** Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. cymosa* R. Br. — Malaysian species: 6. *F. subdura* Ohwi; 7. *F. dura* (Zoll. et Mor.) Merr.; 8. *F. scaberrima* Nees; 9. *F. pierotii* Miq.; 10. *F. insignis* Thwaites; 11. *F. falcata* (Vahl) Kunth; 12. *F. cymosa* R. Br.; 13. *F. sericea* R. Br.

Sect. 3. **Tenerae** Kern, sect. nov. — Annuae, parvae. Culmi tenues,

ad basin foliati. Foliorum laminae bene evolutae, intus ad basin sensim in vaginam transeuntes, eligulatae. Inflorescentia anthelata vel capitata. Glumae spiraliter dispositae, apiculatae vel mucronatae, haud fimbriatae. Stylus triqueter, glaber, stigmatibus 3. Nux trigona, obovata. — Type species: *F. tenera* Schult. — Malaysian species: 14. *F. obtusata* (C. B. Clarke) Ridl.; 15. *F. schultzii* Boeck.

Sect. 4. **Miliaceae** Ohwi, J. Jap. Bot. 14, 1938, 572. — *Fimbristylis* sect. *Globulosae* Ohwi, l. c. — Type species: *F. miliacea* (L.) Vahl. — Malaysian species: 16. *F. globulosa* (Retz.) Kunth; 17. *F. miliacea* (L.) Vahl; 18. *F. aphylla* Steud.; 19. *F. quinquangularis* (Vahl) Kunth; 20. *F. salbundia* (Nees) Kunth; 21. *F. anisoclada* Ohwi.

Sect. 5. **Heleocharoides** Benth., Fl. Austral. 7, 1878, 301. — Type species: *F. pauciflora* R. Br. — Malaysian species: 22. *F. dictyocolea* S. T. Blake; 23. *F. pauciflora* R. Br.

Sect. 6. **Leptocladae** Ohwi, J. Jap. Bot. 14, 1938, 572. — Type species: *F. leptoclada* Benth. — Malaysian species: 24. *F. recta* F. M. Bail.; 25. *F. leptoclada* Benth.; 26. *F. hispidula* (Vahl) Kunth; 27. *F. furva* R. Br.; 28. *F. lanceolata* C. B. Clarke; 29. *F. macassarensis* Steud.

Sect. 7. **Signatae** Kern, sect. nov. — Culmi tenues, ad basin vaginis aphyllis cincti. Inflorescentia anthelata. Spiculae solitariae, angulatae. Rhachilla alata. Glumae spiraliter dispositae, carinatae, mucronatae. Stylus triqueter, stigmatibus 3. Nux pyriformis, tuberculata. — Type species: *F. signata* S. T. Blake. — Malaysian species: 30. *F. signata* S. T. Blake.

Sect. 8. **Abildgaardia** (Vahl) Benth., Fl. Austral. 7, 1878, 299. — *Abildgaardia* Vahl, En. Plant. 2, 1806, 296. — *Cyperus* sect. *Abildgaardia* (Vahl) Endl., Gen. Plant. 1836, 119. — Type species: *F. monostachyos* (L.) Hassk. — Malaysian species: 31. *F. monostachyos* (L.) Hassk.

Sect. 9. **Fuscae** Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. fusca* (Nees) C. B. Clarke. — Malaysian species: 32. *F. nigrobrunnea* Thwaites; 33. *F. eragrostis* (Nees) Hance; 34. *F. cinnamometorum* (Vahl) Kunth; 35. *F. adenolepis* Kern; 36. *F. fuscoides* C. B. Clarke; 37. *F. fusca* (Nees) C. B. Clarke; 38. *F. fulvescens* Thwaites; 39. *F. malayana* Ohwi; 40. *F. vanoverberghii* Kük.; 41. *F. calcicola* Kern; 42. *F. fimbristyloides* (F. v. M.) Druce; 43. *F. intonsa* S. T. Blake; 44. *F. disticha* Boeck.

Sect. 10. **Actinoschoenus** (Benth.) Kern, comb. nov. — *Actinoschoenus* Benth. in Benth. & Hook., Gen. Plant. 3, 1883, 1058. — *Arthrostylis* subgen. *Actinoschoenus* (Benth.) Kük. in Fedde, Rep. 53, 1944, 197. — Type species: *F. thouarsii* (Kunth) Merr. — Malaysian species: 45. *F. thouarsii* (Kunth) Merr.

Sect. 11. **Dichelostylis** Benth., Fl. Austral. 7, 1878, 299. — *Fimbristylis* sect. *Ferrugineae* Ohwi, J. Jap. Bot. 14, 1938, 573, p.p. — Type species: *F. ferruginea* (L.) Vahl. — Malaysian species: 46. *F. ferruginea* (L.) Vahl; 47. *F. sieberiana* Kunth; 48. *F. tristachya* R. Br.; 49. *F. schoenoides* (Retz.) Vahl; 50. *F. subalata* Kern; 51. *F. caesia* Miq.

Sect. 12. **Fimbristylis**. — *Fimbristylis* sect. *Eufimbristylis* Boeck., Linnaea 37, 1871, 3. — *Fimbristylis* sect. *Dichotomae* Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. dichotoma* (L.) Vahl. — Malaysian species: 52. *F. dichotoma* (L.) Vahl; 53. *F. bisumbellata* (Forsk.) Bub.; 54. *F. mer-*

rillii Kern; 55. *F. tenuinervia* Kern; 56. *F. podocarpa* Nees; 57. *F. lineatisquama* Ohwi; 58. *F. perlaxa* Ohwi; 59. *F. alboviridis* C. B. Clarke.

Sect. 13. **Rigidulae** Kern, sect. nov. — Culmi ad basin foliati. Folia eligulata, lamina intus sensim in vaginam transeunte. Spiculae solitariae, teretes vel subangulatae. Glumae spiraliter dispositae, non vel vix carinatae. Stylus compressus, stigmatibus 2. Nux biconvexa, reticulata vel obsolete trabeculata. — Type species: *F. rigidula* Nees. — Malaysian species: 60. *F. trichophylla* Ridl.; 61. *F. rigidula* Nees; 62. *F. sumbaensis* Ohwi; 63. *F. semarangensis* Ohwi.

Sect. 14. **Pogonostylis** (Bertol.) Pax in Engl. & Prantl, Nat. Pfl. Fam. 2, 1887, 113. — *Pogonostylis* Bertol., Fl. Ital. 1, 1833, 312. — *Fimbristylis* sect. *Squarrosae* Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. squarrosa* Vahl. — Malaysian species; 64. *F. griffithii* Boeck.; 65. *F. aestivalis* (Retz.) Vahl; 66. *F. squarrosa* Vahl; 67. *F. gracilenta* Hance; 68. *F. argentea* (Rottb.) Vahl.

Sect. 15. **Neodichelostylis** Camus, Fl. Gén. I. C. 7, 1912, 89 — *Fimbristylis* sect. *Ferrugineae* Ohwi, J. Jap. Bot. 14, 1938, 573, p.p. — Type species: *F. polytrichoides* (Retz.) R. Br. — Malaysian species: 69. *F. polytrichoides* (Retz.) R. Br.; 70. *F. celebica* Ohwi; 71. *F. wetarensis* Ohwi.

Sect. 16. **Nutantes** Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. nutans* (Retz.) Vahl. — Malaysian species: 72. *F. acuminata* Vahl; 73. *F. nutans* (Retz.) Vahl; 74. *F. acicularis* R. Br.

Sect. 17. **Mischospora** (Boeck.) Camus, Fl. Gén. I. C. 7, 1912, 89. — *Mischospora* Boeck., Flora 43, 1860, 113. — *Fimbristylis* sect. *Tetragonae* Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. tetragona* R. Br. — Malaysian species: 75. *F. tetragona* R. Br.

Sect. 18. **Dipsaceae** Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. dipsacea* (Rottb.) C. B. Clarke. — Malaysian species: 76. *F. dipsacea* (Rottb.) C. B. Clarke.

Species of doubtful place: 77. *F. fenestrata* Kük.

IV. NOTES ON SOME OTHER CYPERACEAE

1. Scirpus beccarii Boeck., Bot. Jahrb. 7, 1886, 275.

Boeckeler published this species in an article "Neue Cyperaceen von Argentinien, Mexiko, Alaska und dem Kilimandscharo." Not before I saw a sheet of the type collection (*Beccari 357*) in the Kew Herbarium, I realized that the species in question is native in Malaysia. Beccari collected it on Mt Singgalang (Sumatra). In the Bogor Herbarium there are several Sumatran collections perfectly agreeing with the Beccari plants. The species was placed by Boeckeler in the affinity of *S. varians* and *S. supinus*, presumably on account of the pseudolateral inflorescence. Its true relationship, however, is with *S. fluitans* L. The latter widely spread species occurs at high altitudes on the Javan mountains, and has also been recorded from Papua. Malaysian *S. fluitans* hardly differs from the European; the leaves are slightly broader with more distinct cross-nerves, the glumes somewhat larger with often purplish sides, and the nuts slightly larger. In Sumatra *S. fluitans* is apparently lacking; here it is replaced by *S. beccarii*, strongly resembling it in almost every respect, and mainly characterized by the pseudolateral inflorescence consisting of 1 or 2 spikelets subtended by an erect up to $1^1/_2$ cm long involucral bract. Remarkable is the inconstancy of the number of stigmas (2 or 3 in flowers of the same spikelet). In accordance with this inconstancy the nuts are plano-convex, strongly compressed with a raised dorsal angle, or sharply triquetrous.

SUMATRA. Atjeh, Gajolands, Mt Losir, in and along a brooklet, 3300 m: *Van Steenis 8639* (BO); Mt Kemiri, in tufts on dry soil and submerged in brooklet, 3150—3314 m, *Van Steenis 9666* (BO). Ophir Distr., NW. slope of Mt Talamau, in tufts on moist plain, common, 2750 m: *Bünnemeijer 860* (BO). Mt Singgalang: *Beccari 357 (type coll.)* (K); in brushwood near the lake, common, 2800 m: *Bünnemeijer 2902* (BO); shore of lake, in tufts, 2800 m: *Docters van Leeuwen 3977* (BO, L).

2. **Cyperus iria** L. var. **flavescens** Benth., Fl. Austral. 7, 1878, 276.

Cyperus iria var. *rectangularis* Kük. in Engl., Pflanzenr. Heft 101, 1935, 153 is recorded from India, and in an approaching form from N.S. Wales. The Indian collections represent a markedly distinct species, which I described in Reinwardtia 1, 1952, 463 as *C. alulatus* Kern. At that time I had not seen any Australian specimen of var. *rectangularis*. Also according to Blake (in Black, Fl. S. Australia, 2nd ed. 1, 1948, 143) the South Australian specimens of *C. iria* have rather longer, wider, and more spreading spikelets than the typical form, and approach var. *rectangularis* Kük.

Bentham (1878) described *C. iria* var. *flavescens*, not accounted for in Kükenthal's monograph, with fewer but longer 12—16-flowered spikelets, and assuming nearly the aspect of *C. flavescens* L. This variety is based on collections from Central Australia (*Gosse*; Charlotte Waters, *Giles*; near Mount Murchison, *Bonney*), two of which I could study in the Kew Herbarium. They strikingly resemble *C. alulatus* by the many-flowered widespreading spikelets. However, all other characters being those of *C. iria*, they certainly belong to the latter species.

The correct name of the Australian variety therefore is: *Cyperus iria* L. var. *flavescens* Benth., whereas *C. iria* var. *rectangularis* Kük. (*lectotype Duthie 23284*) is synonymous with *C. alulatus* Kern.

I have seen *C. iria* var. *flavescens* from W. Australia (*N. T. Burbidge, 139, Lefroy 3*), Northern Territory (*R. Helms s.n., R. A. Perry 713*), Central Australia (*Jess Chalmers 31, Giles s.n., Gosse 11*), Queensland (*S. L. Everist 2801, 3953*). It is to be expected to occur in New Guinea.

3. **Cyperus sphacelatus** Rottb., Descr. et Ic. 1773, 26; Kern, Reinwardtia 2, 1952, 107.

The first records for Malaysia (Sumatra, Malay Peninsula, New Guinea) I published in 1952. Recently the species was also collected in Borneo.

BORNEO. Labuan Island, padang near aerodrome: *Van Steenis 17862* (BO, L). NE. Borneo, Nunukan, N of Tarakan, few m alt., *W. Meijer 2453a* (L).

4. **Rhynchospora gracillima** Thwaites, En. Pl. Zeyl. 1864, 435; Boeck., Linnaea 37, 1873, 597; Kurz, J. As. Soc. Beng. 45, II, 1876, 159; Clarke, Fl. Br. Ind. 6, 1893, 671; Ill. Cyp. 1909, t. 71, f. 6—7; Kük., Bot. Jahrb. 75, 1951, 273. — *R. kamphoeveneri* Boeck., Bot. Jahrb. 5, 1884, 508.

Among the *Fimbristylis* material in the Bogor, the Leiden, and the Kew Herbaria I found some specimens of this *Rhynchospora* species collected in Sumatra. Up to the present it was not yet recorded from Malaysia. Its range extends from tropical Africa to S. Asia (S. China, Ceylon, Khasia, Nicobars, Malaysia).

SUMATRA. Atjeh, subdiv. Takengon, near kp. Kutarajang, old secondary forest, 900 m: *Japing 19* (BO). Tapanuli, Asahan valley above Wilhelmina waterfall, moist places, not rare, 975 m: *Lörzing 10021* (BO). W. Sumatra, Fort van der Capellen, on open grassy hill, *Matthew s.n.* (K).

CELEBES. Res. Menado, subdiv. Kolonedale, between Tomata and Kamba: *Eyma 4014* (L).

NEW GUINEA. W. New Guinea, prob. Dompta: *Anang s.n.* (BO, L).

Index to collectors' numbers

Adj. Landbouwcons. Pamekasan 2a p.p.: I-20; Ahern's coll. FB 3390: I-51; d'Alleizette s.n.: I-8; 314: I-33; Alvins 1153: I-45; Anang s.n.: I-33, IV-4; André s.n.: I-33.

Backer s.n.: I-13, I-41; 3269: I-3; 7693: I-41; 8593: I-12; 10818: I-12; 12789: I-2; 12817: I-2; 19297: I-28; 19377: I-38; 19402: I-38; 19914: I-33; 20056: I-33; 20113: I-38; 20245: I-33; 20599: I-38; 20725: I-38; 23945: I-13; 24012: I-12; 24022: I-24; 24224: I-41; 25500: I-12; 25753: I-12; 26503: I-24; 26545: I-33; 27049 pp.: I-22, I-28; 27124: I-40; 27364: I-40; 27477b: I-38; 27695: I-28; 29331: I-13; 29639: I-38; 29858: I-13; 30362: I-36; 30377: I-33; 33599: I-41; 37195: I-38; Baim s.n.: I-6, I-28, I-38, I-51; Bakhuizen van den Brink 2445: I-12; Balansa 189: I-30; 212: I-45; 2786: I-47; 2855: I-9; Banks & Solander s.n.: I-51; Barber 88: I-45; 251: I-33; 307: I-24; 356: I-23; Barclay s.n.: I-24, I-51; Barthe s.n.: I-51; Bartlett 7535: I-29; 8049: I-30; 15550: I-6; Beccari s.n.: I-13, I-23; PB 3736: I-45; PS 357: IV-1; Beguin 2312: I-51; Beumée A 223: I-36; A 446: I-29; A 597: I-24; A 887: I-33; 900: I-38; 5198: I-38; Bloembergen 4099: I-14; Blume s.n.: I-36; Boerlage s.n.: I-38, I-45; Bonney s.n.: IV-2; Bouquet s.n.: I-9; Brass 3576: I-28; 3733: I-13; 4805: I-14; 5734: I-33; 6245: I-51; 7531 A: I-51; 7840: I-24; 7841: I-29; 7846: I-35; 7847: I-33; 11744: I-24; Brinkman 298: I-12; Brousmiche 820: I-47; Brown 5941: I-33; Bruggeman 619: I-12; Bünnemeijer 860: IV-1; 2902: IV-1; 3425: I-12; 3715: I-1; 5186: I-12; 5190: I-12; 8022: I-12; 8142: I-12; 8173: I-12; 10682: I-38; 10837: I-20; Burbidge s.n.: I-6, I-9; 139: IV-2; Burkill SF 6641: I-45; Burkill & Haniff 16800: I-45; 17118: I-45; Buwalda 4547: I-38; 5356a: I-18; 5357: I-51; 5532: I-19; 7902: I-45.

Calléry s.n.: I-7; Cantley 3065: I-45; Carr 11034: I-40; 11198: I-38; 11264: I-38; 11847: I-3; Castillo BS 22716: I-37; Chalmers 31: IV-2; Chaper s.n.: I-4; Clemens 3002: I-8; 3224: I-8; 3546: I-45; 4297: I-51; 4312: I-30; 8286 A: I-26; 10750: I-7; 16582: I-37; 18020bis: I-33; 21348: I-45; 27681: I-9; 51891: I-14; Coert 499: I-40; 500: I-36; 501: I-13; 1741 p.p.: I-28, I-38; Copeland 100 p.p.: I-13; 586: I-13; Corner s.n.: I-27, I-33, I-42; SF 37858: I-42; Corner & Nauen s.n.: I-42; SF 37847: I-42; Cuming 396: I-43; 675: I-51; 1396: I-43; 1413: I-33; Curran FB 16783: I-46; Curtis 1867: I-9; 2175: I-25.

Van Daalen 221: I-12; Dahl s.n.: I-40; Dallachy s.n.: I-28; Delavay 4821: I-38; Didrichsen 3455: I-9; 3935: I-12; Docters van Leeuwen s.n.: I-13, I-38; 1218: I-38; 3977: IV-1; 13353: I-2; Dorgelo 1644 pp.: I-33; 1664: I-36; 1712: I-3; 3304: I-38; Drège s.n.: I-2; Duthie 23284: IV-2.

Edaño PNH 11025: I-33; 15397: I-13; 15619: I-13; Elbert 3076: I-33; 3088: I-6; 3091: I-19; 4553: I-17; Elmer 6497: I-14; 22358: I-51, Endert 1836: I-4; 1982: I-4; Enoh 318: I-45; Everist 2801: IV-2; 3953: IV-2; Eyma 347: I-38; 353: I-24; 357: I-33; 2953: I-45; 3381: I-28; 4007: I-24; 4014: IV-4; 4029: I-45.

Fénix 30022: I-40; BS 26093: I-38, I-46; Forbes 19: I-24; 893: I-12; Forster S 4: I-45; S 18: I-6.

Gachalian PNH 15476: I-13; Gaudichaud s.n.: I-33; Germain 101: I-45; Gibbs 2771: I-28; Giles s.n.: IV-2; Glassman 514: I-40; 521: I-13; Godefroy s.n.: I-15; 50: I-4; 815: I-22; 908: I-30; Goering sect. II no 149: I-12; Gosse 11: IV-2; Griffith

s.n.: I-45; 6311: I-45; 6313: I-41; 6331: I-45; Grutterink 3164: I-13; Le Guillou s.n.: I-19.

Haenke s.n.: I-7; Hallier s.n.: I-12; 740: I-9; Ham 2: I-23; Hamel 1196: I-1; Hance 13227: I-47; Haniff & Nur 4363: I-45; 7077: I-42; Helfer (Rel. Helfer.) 145: I-45; Helfer 6143/1: I-30; 6309: I-45; Helms s.n.: IV-2; Henderson 22960: I-23; SF 22083: I-40; 22259: I-42; 24105: I-45; 29062: I-42; 29683: I-42; Hochreutiner 2439: I-2; Hollrung 836: I-33; Holman 54: I-38; Holttum 28411: I-41; SF 37793: I-33; Hooker 203: I-41; 230: I-41; Horsfield s.n.: I-1; 1069: I-12; 1073: I-2; Miss Hose s.n.: I-9; 201: I-9; Hose s.n.: I-33; 94: I-33; 95: I-23; Hullett s.n.: I-9, I-45; Hume 7333: I-33; 7347: I-33; 7391: I-33; 7711: I-33.

Iboet 358a: I-10.

Jacobson 2526: I-12; Japing 19: IV-4; Jenkins 212: I-41; Jochems s.n.: I-38; 251: I-12; 3154: I-13; Joseph s.n.: I-48; Junghuhn s.n.: I-36; 412: I-12; 532: I-36.

Kamphoevener 2484: I-21; 2485: I-21; 2785: I-45; Kanehira & Hatusima 13182: I-6; 13683: I-14; Kaudern 147: I-14; 412: I-13; Kern 7682: I-12; 8149: I-12; Kerr 7738: I-23; 13142: I-35; 21359: I-50; 21361: I-49; 21366: I-48; Kjellberg 738: I-45; 1189: I-33; 3739a: I-38; 3748: I-6; Koch: I-51; Kooper s.n.: I-13, I-36; 513b: I-12; 621: I-13; 650b: I-11; Koorders 14930: I-12; 21430: I-45; 23295: I-12; 28244: I-11; 34680: I-38; 40794: I-13; 44334: I-45; Kunstler 1690: I-25; Kuntze 4455: I-12; Kurz s.n.: I-9; 330: I-12; 1832: I-12; 1842: I-12.

Labillardière s.n.: I-37; Lace 4210: I-28; Lam 891: I-45; 1115: I-45; 2243: I-12; 2245: I-12; Landbouwleraar Djogja 24: I-13; Landbouwopz. Tundjung 7: I-33; Lauterbach 247: I-7; 348: I-40; Lecomte & Finet 954: I-8; 2025: I-45; Ledermann 7321: I-45; Lefèvre 485: I-32; Lefroy 3: IV-2; Leschenault s.n.: I-31; Lobb s.n.: I-37; Loher 747: I-33; 756: I-39; 757: I-39; 758: I-39, I-41; 760: I-20; 766: I-40; 1340: I-13; 1342: I-37; 1343: I-24; Lörzing 404: I-12; 3482: I-13; 4245: I-12; 6506: I-30; 6507: I-30; 6643: I-12; 6646: I-30; 6725: I-12; 7701 p.p.: I-46; 7782: I-26; 8026: I-26; 8028: I-1; 8030: I-12; 8054: I-46; 8102: I-26; 8389: I-1; 8436: I-12; 8534: I-14; 8597: I-1; 8999: I-12; 9023 I-28; 9370: I-14; 9751: I-47; 9935: I-12; 10021: IV-4; 10021 A: I-29; 10132: I-24.

MacGillivray 35: I-16; R. C. MacGregor 32233: I-6; BS 14226: I-43; W. MacGregor s.n.: I-6; 70: I-36; Main 1710: I-4; 1749: I-4; 1813: I-45; 1819: I-4; 1844: I-4; Mangubat BS 1327: I-3; Marche 420: I-33; Matthew s.n.: I-12, I-24, IV-4; Mearns BS 2885: I-33; Van der Meer Mohr 151: I-30; Mendoza PNH 18357: I-51; D. F. Merrill 20: I-41; E. D. Merrill 241: I-43; 261: I-37; 2785: I-24; 7359: I-20; 7664: I-5; 8013: I-40; 9322: I-33; 9350: I-1; 9389: I-24; 9566: I-46; 9796: I-33; 9799b: I-40; 9808: I-13; Merrill Phil. Pl. 507: I-36; 551: I-14; 558: I-5; 2093: I-46; Meijer 2453a: IV-3; Meijer Drees 88: I-21; 544: I-45; Monod de Froideville s.n.: I-12; 1714: I-13; Motley 85: I-9; 540: I-45; 621: I-24; Mousset 495: I-13; Mueller s.n.: I-31.

Nauen s.n.: I-9; SF 37487: I-9; Noerkas 33: I-51; 218: I-15; Nur s.n.: I-9; 5272: I-9; SF 4513: I-9; 34378: I-42.

Ostendorf s.n.: I-38.

Perry 713: IV-2; Pierre s.n.: I-24, I-30, I-32, I-45, I-47; Pleyte 1120: I-6; Poilane 27350 p.p.: I-35; Polak 90: I-14; Posthumus 2044: I-45; Prain's coll. 65: I-45; Proppe 24: I-31; Pulsford 7: I-7.

Raap 96: I-12; Radermacher s.n.: I-37; Rahmat si Boeea (= Rahmat si Toroes) 1703: I-28; 1721: I-47; 1796: I-29; 1898: I-28; 2649: I-28; 2806: I-28; 4080: I-33; 4081: I-21; 7470: I-12; 7997: I-12; 8733: I-12; 8757: I-12; 9117: I-12; Ramos BS 1388: I-40; 1443 p.p.: I-38; 4853: I-13; 4930: I-36; 4935: I-13; 7856: I-43; 7859: I-24; 7894: I-33; 8074: I-33; 12523: I-3; 12539: I-38; 21739: I-38; 21740: I-51; 27232: I-11; 27625: I-33; 32690: I-33; 32737: I-7; 32742: I-24; 32797: I-17; 32809: I-21; 32811: I-6, I-43; 41141: I-13; 42927: I-13; 42936: I-33; 42938: I-40; Ramos Phil. Pl. 1423: I-13; 1431: I-38; 1443: I-40; 1447: I-33; Ramos & Edaño BS 31001: I-40; 85126: I-31; 85193: I-43; Rant 619: I-51; Rappard 142: I-38; P 17a: I-12; Reillo BS 19300: I-13; Reinwardt s.n.: I-12; Ridley s.n.: I-9, I-12, I-33, I-45; 2: I-45; 43: I-45; 83: I-9; 107: I-51; "1011": I-51; 1268: I-45; 1739: I-45; 1740: I-9; 1740a: I-9; 1740c: I-9; 8430: I-9; 9042: I-23; 10011: I-51; 10829: I-51; 11377: I-24; 14820: I-6; 14822: I-23; 14876: I-33; 14877: I-24; 14878: I-33; 14879: I-33; 15720: I-1; Riedel s.n.: I-23; Robinson 438: I-51; 1071: I-22; 1894: I-13; BS 6450: I-51; Robinson & Kloss s.n.: I-12; 118: I-14; Rogers 3008: I-28; Rogerson 1003: I-33; 1005: I-39; Rostados 41: I-45; van Royen 3945: I-24; 3963: I-24; 3964: I-33; 4124: I-28; 4146: I-6; 4309: I-40; 4490: I-33; 4574: I-13; 4688: I-45;

4805: I-45; 4880: I-18; 4881: I-18; 4887: I-24; 4972: I-26; 5034: I-24; Rutten-Kooistra S 1: I-4; S 6: I-45; Ruttner 128: I-14; 282: I-2; van Rijckevorssel 16: I-12.

Sampson 919: I-47; Sapiin 2154: I-12; Schlechter s.n.: I-28; 13867: I-28, I-30; 13879: I-51; Schultz 96: I-10; 792: I-10; Seidenfaden 2326: I-22; Seimund s.n.: I-33; Sinclair s.n.: I-9; SF 38906: I-33; 40131: I-41; van Slooten 2428: I-41; Smith & Rant s.n.: I-12; Sohns 56: I-28: Soriano PNH 16398: I-33; Specht 20: I-10; van Steenis s.n.: I-12; 1663: I-12; 2243: I-12; 3070: I-45: 3976: I-12; 4217: I-2; 4292: I-2; 4357: I-2; 4431: I-12; 4533: I-2; 5820: I-12; 6248: I-24; 6666: I-13; 6692: I-40; 6693: I-33; 7424: I-2; 7450: I-46; 7484: I-33; 7485: I-24; 7493: I-13; 7520: I-28; 7520a: I-38; 7529: I-13; 7586: I-10; 8171: I-13; 8198: I-15; 8208: I-28; 8639: IV-1; 9666: IV-1; 10373: I-33; 10907: I-2; 11805 I-24; 12516: I-36; 12565: I-4; 17433: I-44; 17862: IV-3; 17988: I-31; 18094: I-33.

Talmy s.n.: I-34, I-35; Teysmann 10944: I-4; Thorel s.n.: I-9, I-34, I-35; 465: I-32; 506: I-23; 507: I-45; 537: I-47; 556: I-9; 2901: I-48; Thwaites CP 679: I-25; 2967: I-2; 3317: I-6; Topping 1456: I-9; Toxopeus 516: I-51.

U Thein Lwin 44: I-45; d'Urville s.n.: I-24, I-51.

Vanoverbergh s.n.: I-26; 273: I-26; 2162: I-12; BS 1183: I-1; Vesterdal 228: I-6; 268: I-9; Vidal 3984: I-38; De Voogd 2521: I-33; Vorderman s.n.: I-23.

Waitz s.n.: I-9; Wallich s.n.: I-9; 3499: I-14; 3507c: I-4; 3526: I-14; 3530: I-24; Warburg 3541: I-2; 3542: I-2; 11162: I-12; Williams 45: I-38; 64: I-38; 1239: I-14; 1968: I-51; Winkler 2557: I-45; Wisse 998: I-12; De Wit 4095: I-36; Wuth s.n.: I-31.

Zollinger 413: I-40; 700: I-24; "1019": I-20; 1059: I-20; 1609: I-12; 3524: I-12; 3796: I-38.

Index to scientific names

New taxa and combinations are printed in **bold face** type; synonyms are in *italics*. Figures are indicated by an asterisk (*).

Abildgaardia Vahl III: 8
— *brevifolia* Steud. I: 51
— *cyperoides* (Presl) Nees I: 24
— *fimbristyloides* F. v. M. I: 28
— *fulvescens* Thwaites I: 25
— *fusca* Nees I: 24
— *pauciflora* (Brongn.) Kunth I: 24
— *pubescens* Presl I :17
Actinoschoenus Benth. III: 10
Arthrostylis subgen. *Actinoschoenus* (Benth.) Kük. III: 10
Cladium cyperoides Merr. I: 26
Cyperus alulatus Kern IV: 2
— iria L.
— — var. flavescens Benth. IV: 2
— — *var. rectangularis* Kük. IV: 2
— *sect. Abildgaardia* (Vahl) Endl. III: 8
— sphacelatus Rottb. IV: 3
Fimbristylis
— acicularis R. Br. I: 51
— acuminata Vahl
— — *var. minor* Nees ex Boeck. I: 51
— — *var. pumila* Nees I: 51
— — *var. setacea* (Benth.) Miq. I: 51
— *acutifolia var. minor* (sphalm.) Rolfe I: 51
— **adenolepis** Kern I: *22
— *aestivalis* (non Vahl) C. B. Clarke I: 45
— aestivalis (Retz.) Vahl
— — *f. glabra* Kük. I: 45
— — *var. glaberrima* Boeck. I: 45
— alata Camus I: 34

Fimbristylis alboviridis C. B. Clarke I: 41

— *alleizettei* Camus I: 33

— *angustifolia* Ridl. I: 23

— anisoclada Ohwi I: 15

— *annamica* Camus I: 33

— *annua* (All.) R. & S.

— — *var. gracilis* Back. I: 38; I: 44

— — *var. pluristriata* Back. I: 41

— — *var. podocarpa* (Nees) Kük. I: 40

— aphylla Steud. I: 12

— **arenicola** Kern I: *49

— *asperrima* (non Boeck.) Ridl. I: 1

— autumnalis (L.) R. & S.

— — *var. microcarya* (F. v. M.) Kük. I: 3

— bispicata

— — *var. monostachya* Nees I: 33

— bisumbellata (Forsk.) Bub. I: 37

— *brachyphylla* Presl I: 7

— *brevifolia* Presl I: 7

— **brunneoides** Kern I: *50

— *bursifolia* (sphalm.) Vidal I: 51

— caesia Miq. I: 36

— **calcicola** Kern I: *27

— cinnamometorum (Vahl) Kunth I: 21

— *clavinux* C. B. Clarke I: 17

— *complanata* (Retz.) Link

— — *var. kraussiana* (Krauss) C. B. Clarke I: 2

— — *var. microcarya* (F. v. M.) C. B. Clarke I: 3

— *compressa* Boeck. I: 32

— *connectens* Thwaites I: 2

— consanguinea Kunth I: 2

— *corniculata* Merr. I: 20

— *cyperoides* R. Br. I 21

— *dallachyi* F. v. M. I: 28

— *dichotoma* (non Vahl) Camus I: 45

— dichotoma (L.) Vahl I: 37

— *diphylla* (non Vahl) K. Schum. & Laut. I: 40

— *diphylla Vahl*

— — *f. malasica* C. B. Clarke I: 39

— — *f. pluristriata* C. B. Clarke I: 40

— — *var. pluristriata* C. B. Clarke I: 40

— — *var. podocarpa* (Nees) Kük. I: 40

— disticha Boeck. I: 30

— *disticha* (non Boeck.) Kük. I: 28

— *erythradenia* Camus I: 23

— *exilis* (Kunth) R. & S. I: 17

— — var. *oligostachya* C. B. Clarke I: 17

— falcata (Vahl) Kunth I: 7

— *ferruginea* (non Vahl) Decne I: 31

— — *var. foliata* Benth. I: 31

— — *var. sieberiana* (Kunth) Boeck. I: 31

— *ferruginea* (non Vahl) Vidal I: 43

— fimbristyloides (F. v. M.) Druce I: 28

— fulvescens Thwaites I: 25

— furva R. Br. I: 18

— fusca (Nees) C. B. Clarke I: 24

— — *var. hispidissima* Kük. I: 26

— — *var. longifolia* Boeck. I: 25

— *fusca* (non C. B. Clarke) Merr. I: 26

— *fusca* (non C. B. Clarke) Ridl. I: 25

— fuscoides C. B. Clarke I: 23

Fimbristylis *fuscoides* (non C. B. Clarke) Camus I: 30
— globulosa (Retz.) Kunth
— — *var. aphylla* (Steud.) Miq. I: 12
— *globulosa* (non Kunth) Ohwi I: 14
— gracilenta Hance I: 47
— griffithii Boeck. I: 45
— *haenkei* Presl ex Dietr. I: 7
— hispidula Kunth I: 17
— — *var. submonostachya* Boeck. I: 17
— *horsfieldii* C. B. Clarke I: 2
— insignis Thwaites I: 6
— intonsa S. T. Blake I: 29
— *junciformis* (Nees) Kunth I: 7
— *kamphoeveneri* Boeck. I: 21
— *kraussiana* Hochst. ex Krauss I: 2
— *lacei* Turr. I: 28
— lanceolata C. B. Clarke I: 19
— **lasiophylla** Kern I: *8
— limosa Poepp. & Kunth I: 45
— *littoralis* Gaud. I: 13
— *longispica* (non Steud.) Ridl. I: 6
— macassarensis Steud. I: 20
— *macgillivrayi* C. B. Clarke I: 16
— *makinoana* Ohwi I: 46
— *marianna* Gaud. I: 33
— — *var. foenea* Kük. I: 33
— *maxima* K. Schum. I: 33
— **merrillii** Kern I: *38
— microcarya F. v. M. I: 3
— *miliacea* (non Vahl) S. T. Blake I: 13
— miliacea (L.) Vahl
— — **var. macrostachya** Kern I: 11
— — *var. validior* Miq. I: 11
— *monostachya* (non Hassk.) Backer I: 36
— *monticola* (non Steud.) Backer I: 2
— *nigrobrunnea* (non Thwaites) Camus I: 8
— *nigrobrunnea* (non Thwaites) Kük. I: 26
— — *var. thorelii* Camus I: 9
— *nutans* (non Vahl) Naves I: 33
— obtusata (C. B. Clarke) Ridl. I: 9
— *pallescens* (Roxb.) Nees I: 37
— *paludosa* Merr. I: 14
— *paucispicata* F. v. M. I: 31
— *paupercula* (non Boeck.) Kük. I: 2
— *petrogena* Ohwi I: 6
— pierotii Miq. I: 5
— *pinetorum* Merr. I: 5
— *platystachys* Boeck. I: 10
— — *var. schultzii* (Boeck.) Domin I: 10
— podocarpa Nees I: 40
— *podocarpa* (non Nees) Ridl. I: 33
— *polymorpha var. c.* Boeck. I: 33
— *preslii* Kunth I: 17
— *propinqua* R. Br. I: 46
— pubescens Link I: 17
— **pubisquama** Kern I: 32
— *quinquangularis* (non Kunth) Koord. I: 12
— quinquangularis (Vahl) Kunth I: 13
— — *f. abludens* Backer I: 3
— — *var. crassa* Clarke I: 12
— recta F. M. Bail. I: 16

Fimbristylis *rigidifolia* Ridl. I: 24
— rigidula Nees I: 43
— *salbundia* (non Kunth) Boeck. I: 12
— salbundia (Nees) Kunth I: 14
— scaberrima Nees I: 4
— *schoenoides* (non Vahl) Backer I: 33
— schultzii Boeck. I: 10
— sect. Abildgaardia (Vahl) Benth. III: 8
— **sect. Actinoschoenus** (Benth.) Kern III: 10
— sect. Cymosae Ohwi III: 2
— sect. Dichelostylis Benth. III: 11
— *sect. Dichotomae* Ohwi III: 12
— sect. Dipsaceae Ohwi III: 18
— *sect. Eufimbristylis* Boeck. III: 12
— *sect. Ferrugineae* Ohwi III: 11, 15
— sect. Fimbristylis III: 12
— sect. Fuscae Ohwi III: 9
— *sect. Globulosae* Ohwi III: 4
— sect. Heleocharoides Benth. III: 5
— sect. Leptocladae Ohwi III: 6
— sect. Miliaceae Ohwi III: 4
— sect. Mischospora (Boeck.) Camus III: 17
— sect. Neodichelostylis Camus III: 15
— sect. Nutantes Ohwi III: 16
— sect. Pogonostylis (Bertol.) Pax III: 14
— **sect. Rigidulae** Kern III: 13
— **sect. Signatae** Kern III: 7
— *sect. Squarrosae* Ohwi III: 14
— **sect. Tenerae** Kern III: 3
— *sect. Tetragonae* Ohwi III: 17
— sect. Trichelostylis (Lestib.) Boeck. III: 1
— semarangensis Ohwi I: 44
— *setacea* Benth. I: 51
— — *var. brevifolia* (Steud.) C. B. Clarke I: 51
— sieberiana Kunth I: 31
— *sp. prox. Fimbr. fusca* Henders. I: 42
— **spicigera** Kern I: *48
— squarrosa Vahl I: 46
— — var. esquarrosa Makino I: 46
— *squarrosa* (non Vahl) Merr. I: 38
— *squarrosa* (non Vahl) Zoll. I: 40
— *stenochlaena* Kük. I: 24
— *straminea* (non Turr.) Ohwi I: 28
— straminea Turr. I: 9
— **subalata** Kern I: *35
— *subbispicata* (non Nees) C. B. Clarke I: 33
— — *var. caesia* (Miq.) C. B. Clarke I: 36
— *subfusca* Camus I: 24
— *subgen. Trichelostylis* (Lestib.) A. Gray III: 1
— *tenera* (non Schult.) C. B. Clarke I: 20
— tenera Schult.
— — *var. obtusata* C. B. Clarke I: 9
— **tenuinervia** Kern I: *39
— thomsonii Boeck. I: 1
— *thorelii* Camus I: 47
— *thwaitesii* Boeck. I: 6
— trichophylla Ridl. I: 42
— — **var. erecta** Holttum ex Kern I: 42
— tristachya R. Br. I: 33
— vanoverberghii Kük. I: 26
— *velata* R. Br. 1: 46

Gramen polytrichum Rumph. I: 51
Gussonea cyperoides Presl I: 24
— *pauciflora* Brongn. I: 24
Isolepis cochleata Steud. I: 51
— *exilis* Kunth I: 17
— *longispica* Steud. I: 24
— *sect. Trichelostylis* (Lestib.) Endl. III: 1
Mariscus fallax Fernald I: 26
Mischospora Boeck. III: 17
Pogonostylis Bertol. III: 14
Rhynchospora
— *? anomala* Steud. I: 24
— gracillima Thwaites IV: 4
— *kamphoeveneri* Boeck. IV: 4
Scirpus
— beccarii Boeck. IV: 1
— *bisumbellatus* Forsk. I: 37
— *cinnamometorum* Vahl I: 21
— *falcatus* Vahl I: 7
— *hispidulus* Vahl I: 17
— *pallescens* Roxb. I: 37
— *quinquangularis* Vahl I: 13
Trichelostylis Lestib. III: 1
— *complanata* (Retz.) Nees I: 14
— *junciformis* Nees I: 7
— *salbundia* Nees I: 14

MISCELLANEOUS BOTANICAL NOTES VII [1])

by

C. G. G. J. VAN STEENIS

(Flora Malesiana Foundation, Leiden)

(Issued 31. XII. 1955)

53. Reduction of Tardiella to Casearia (Flacourt.)

In a posthumous paper of Gagnepain a new monotypic genus *Tardiella annamensis* Gagn. has been described, assigned to the *Canellaceae* (Not. Syst. 15: 32—33. 1954). The author remarks that for a long time *Canellaceae* were restricted to the New World, but that later one genus, *Cinnamosma*, from Madagascar was described by Baillon. *Warburgia* occurs further in tropical East Africa.

The characters of the new genus seemed rather aberrant in *Canellaceae* which possess 3 sepals instead of 5 in *Tardiella*, in the fascicled flowers. Phytographically the occurrence of a *Canellacea* in Tonkin would be most remarkable. The translucent dots and lines in the leaves led me to suspect identity with *Casearia* with which the description fits very well indeed.

Through the kindness of Dr Leandri, I could borrow the type from the Paris Museum, and could observe the presence of stipules (which are absent in *Canellaceae*) and corroborate my preliminary opinion which is shared by Dr Sleumer and apparently also by Dr Kuhlmann who put a label to the type assigning it to the *Flacourtiaceae*. There is no doubt whatsoever that *Tardiella* is synonymous with *Casearia*.

As to the specific identity there is less certainty as the type is rather poor and bears only juvenile leaves. Apparently it comes close to *C. glomerata* Roxb. but both Dr Sleumer and I are of opinion that a final decision should be postponed until the SE. Asiatic *Casearias* will be revised; we are reluctant to transfer it at the present moment.

It is most unfortunate that the new generic name dedicated to one of our distinguished contemporary botanists has to become obsolete, a fate she shares with many others as I remarked formerly (Bull. Bot. Gard. 17: 461. 1948); may it soon be revived in some other permanent form.

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[1]) The first paper in this series appeared in Bull. Bot. Gard. Btzg III, 17: 383—411. 1948; the 2nd in Blumea 6: 243—246. 1948; the 3rd in Bull. Bot. Gard. Btzg III, 18: 457—461. 1950; the 4th in Reinwardtia 1: 467—481. 1952; the 5th in Acta Bot. Neerl. 2: 298—307. 1953; the 6th in Blumea 7: 595—598. 1954.

54. Field-notes on Kjellbergiodendron (Myrt.)

In Nov. 1953 I could make some field-notes on a cultivated specimen of *Kj. celebicum* (Koord.) Merr. in fruit in the Botanic Gardens at Bogor, in addition to the description by Burret (Notizbl. Ber.-Dahl. 13: 101—106. 1936).

Medium-sized tree, c. 15 m. Bole smooth, terete, bark reddish, peeling in thin slices like in many Eugenias; buttresses very small. Ripe fruit rosa peach-coloured, smooth, dull, immature green. Seed canary-yellow in section. Pericarp of immature fruits 2—4 mm diam., that of the mature ones c. 7 mm diam. Immature fruits c. 3 by 2.25 cm, mature ones 3.25 by 2.75 to 4.25 by 3.25 cm, broadly ovoid to broadly ellipsoid. Seed basally attached; testa inside brown, glossy, veined, entirely connate with the spongy pericarp which is not segregated in endo-, meso-, and exocarp; pericarp with many large oil-glands. The seed smells in section resinous-aromatic and exudes a sticky substance. Cotyledons very unequal; from the outside only one cotyledon is visible embracing the other, small cotyledon which is once folded and is about equal in size to the stout rootlet. It should be remarked that the structure of the seed stresses the affinity of this genus with *Whiteodendron* (cf. Acta Bot. Neerl. 1: 435—442. 1952).

55. Two padang plants from Southeast Celebes

Among the plants collected by J. Elbert in the Rumbia district a. 1909 I found two new records for SE. Celebes, from a place called Wambakowu, in the Rumbia District, which are apparently from an open, moist, sandy lowland locality viz: *Xyris pauciflora* Willd. (*no 3087*) and *Drosera burmanni* Vahl (*no 3094*). Siliceous sand was adhering to the roots. This would suggest the local occurrence of typical padang soils in the Rumbia District (cf. Bull. Jard. Bot. Btzg III, 12: 179—186. 1932).

56. A new Neoalsomitra from South Malaysia (Cuc.)

Recently I gave¹) some ecological and medicinal data on a remarkable, podagric *Neoalsomitra* which is characterized by a swollen, succulent, spiny stem-base. In the absence of flowers and fruits it was impossible to verify its specific identity.

Thanks to the diligent help of the curators of Kebun Raya Indonesia, Bogor, male flowers and fruits have been received from cultivated specimens in the Botanic Gardens at Bogor. These new data corroborate my tentative opinion that it represents a new species.

Neoalsomitra podagrica n. sp. (nom. prov. in Webbia 11: ... fig. 1955). — *Fig. 1.*

Differt a speciebus descriptis caudice incrassato carnoso spinoso, foliis pedatis 5-foliolatis eglandulosis, foliolis papyraceis subglabris, inflorescentia puberula pilis ecapitatis, fructu tubuloso-cupulato 1.25—2 × 0.75—0.8 cm,

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¹) Webbia 11: 189—196, 2 fig. 1955.

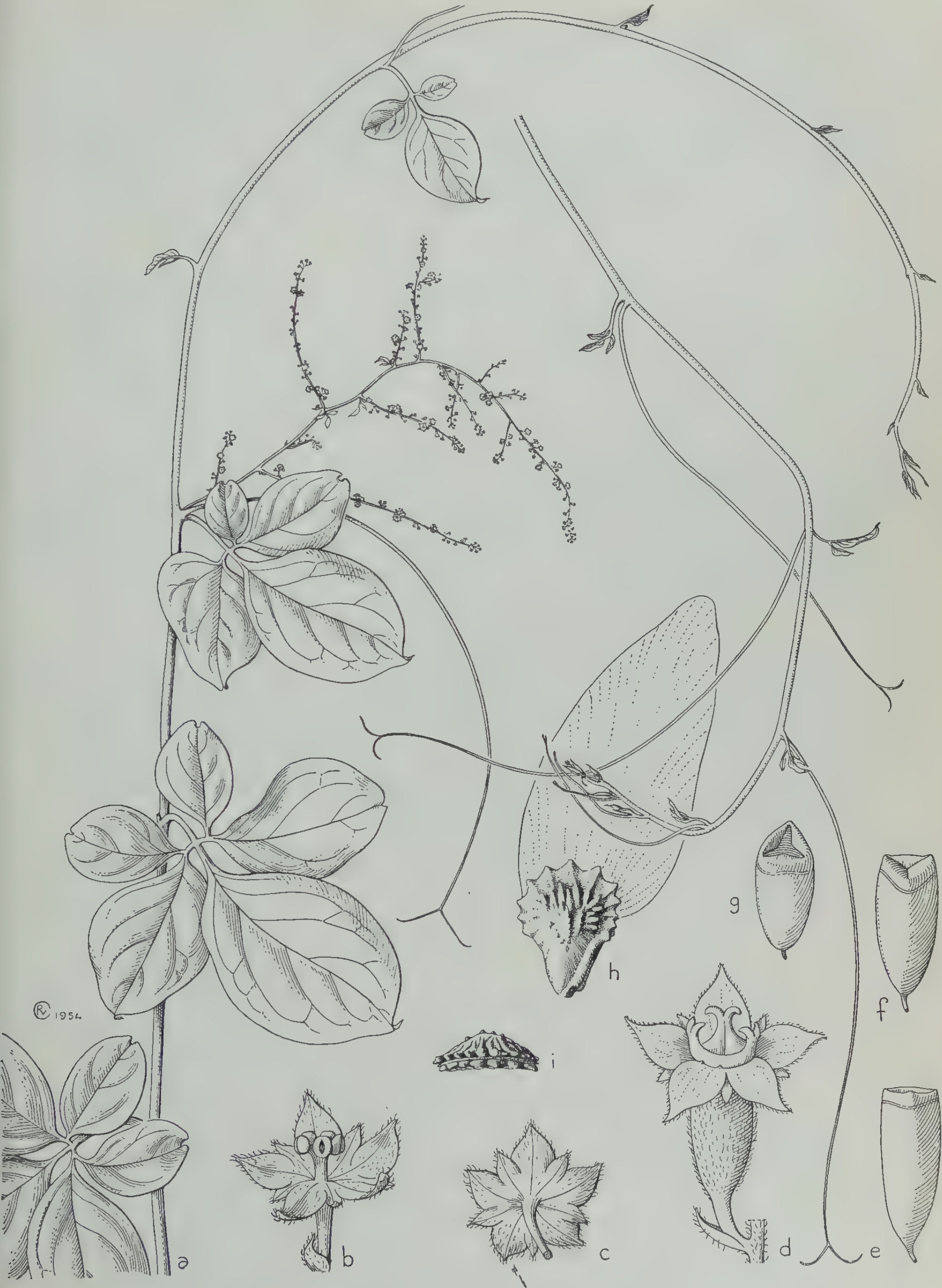
seminibus hyalino-alatis applanato-pyriformibus radiato-verruculosis 4—5 × 3—3.5 mm.

Stems green, up to 30 m or more, glabrous (infl. excepted); stem-base spindle-like thickened up to 100 by 10 cm, often followed by additional, superposed, thickened bases of lateral stems, thickenings green, fleshy, provided with obliquely patent, strong, green, hard, spines 1.5—5 cm long going up to c. 3—5 m from the base and representing metamorphozed leaves. Tendrils only on innovations, mostly early caducous, 5—15 cm long, shortly bifid. Lower leaves pedately 5-foliolate, upper leaves 3-foliolate; leaflets papyraceous to membranaceous, glabrous to faintly puberulous, obovate, bluntish, tip glandular, (caducous-)mucronate, base cuneate, all eglandular; middle leaflet largest, c. 6—11 by 4—7 cm, 1—2 cm petiolulate, lateral leaflets unequal-based, 5—10 by 3—6 cm, 0.75—1.5 cm petiolulate; lower additional leaflets smaller, 0.25—0.5 cm petiolulate, inserted on the petiolules of the lateral leaflets. Male flowers in numerous, lateral, divaricate, axillary, short-pubescent, bracteate, pyramidal, rich-flowerd panicles, 14—40 cm long; ultimate branches raceme-like but flowers in fascicles; axis and stalks angular. Lower bracts represented by reduced 3-foliolate leaves, upper ones simple bracts, gradually smaller, 5—3—1 mm, narrow, acute, those below the pedicels 1 mm, haired. Pedicels 1.5—1.5 mm, glabrous, terete. Expanded flowers flat, c. 2.5—3.5 mm diam., incised to about halfway, haired. Calyx segments ovate-acute, 0.5 mm. Corolla segments broadly triangular, ovate-acute, c. 1 mm. Androecium glabrous, c. 1 mm high, the column c. 0.75 mm, terete. Anthers 5, on horizontal short filaments 0.25 mm; anthers roundish c. 0.25 mm, with a vertical slit, connective not produced. Female flowers greenish-yellow, curved upwards forming one-sided racemes on the ultimate panicle branches; branches shortly crisped-pubescent as are the bracts, the ovary and the floral segments. Pedicel c. 1 mm, glabrous. Ovary terete, tubular, c. 3 by 1.25—1.50 mm. Calyx lobes acute oblong, hardly 1 mm long. Corolla lobes broad-ovate, acute, c. 2 by 1.5 mm, some with 2 or more minute basal colleter-like appendages (glands ?). Styles 3, on the margin of the ovary top, split halfway into 2 thick, recurved stigmatic arms, incl. these hardly 1 mm high, grooved inside, grooves continued over the ovary tip meeting centrally. Fruits in rich, large panicles, glabrous or practically so, tubular-cup-shaped, 0.25—0.5 cm stalked, 1.5—2 by 0.75—0.8 cm; rim c. 1—1.5 mm high. Seeds flat, pear-shaped, 4—5 by 3—3.5 mm, unequal-sided, with irregular radial crests and warts; wing exceedingly delicate, hyaline, oblique, 6.5—8.5 by 3.5—4.5 mm, early caducous.

Type: ♂ ex Timor Cult. Hort. Bog. II. O. X. 6 (BO, L); ♀ ditto XVIII. A. 45a (BO, L).

Distribution: ? South Celebes and Lesser Sunda Islands (Island of Semau; throughout Timor), often on limestone rocks, from the lowland to the hills.

Fig. 1. *Neoalsomitra podagrica* Steen. — a. Apex of young ♂ flowering stem, × $^2/_5$, b-c. ♂ flower, × 6, d. ♀ flower, × 6, e-g. fruits, nat. size, h. seed, surface view, × 4, i. apical view, wing removed, × 4 (♂ after Cult. Hort. Bog. II. O. X. 6, ♀ ditto XVIII. A. 45a).



R 1954
a
b
c
d
e
f
g
h
i

This species is allied to several others in the genus which was revised by Cogniaux [1]) and by Hutchinson [2]), by the spiny stems and swollen stem-bases. *N. balansae* from Indo-China possesses similar leaves and flowers, but has capitate-glandular hairs in the inflorescence and longer pedicels. *N. pubigera*, from Burma and Malaya, has a short staminal column but long filaments, longer, gland-tipped, hairy pedicels, and a densely puberulous fruit, *N. schefferiana* from Celebes and New Guinea is described as 3-foliolate, with densely villous petioles and petiolules, and a hairy leaf-undersurface.

As the plant is used medicinally in Timor I was curious to know whether any special constituent could be traced. Dr R. Hegnauer, professor of pharmacognosy at Leyden University, was so kind to have this examined by one of his students, Mrs Tjia-Lo Gwat Nio on a portion of the thickened stem-base of the old plant cultivated in the Botanic Gardens, Leyden, kindly put at our disposal by the Curator, Mr H. Veendorp. The results are the following: fresh-weight 200 g, dry weight 30 g, water content 85 %. Alcaloids, tannines, saponines, flavonoid compounds and cyanogenic glucosides absent. The main constituent is an extremely bitter resin, with strong haemolytic action, and giving precipitations with several alcalic reagentia. The bitter value (dilution in which it can just be tasted) is 25.000 by comparison of quinine chloride 100.000. No crystalline compounds could be extracted from the impure resinous fraction.

57. **Exocarpus latifolia in Borneo** (Santal.)

Hitherto the localities of *Exocarpus latifolia* R. Br. seemed to be restricted to Eastern Malaysia, though some localities in Palawan and Jolo Island (Sulu group) and E. Java showed that this species is not absent from the Sunda shelf area. Mr G. H. S. Wood and Mr J. Wyatt-Smith have now found it in North Borneo: Lahad Dat Distr., central ridge on Takawan Island, 120 m alt., Sept. 25, 1954 (*San 4268*).

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[1]) Pflanzenreich Heft 66: 11—18. 1916.

[2]) Ann. Bot. n.s. 6: 97—102. 1942.

REVISION OF THE BURSERACEAE OF THE MALAYSIAN AREA IN A WIDER SENSE

Va. Haplolobus

by

H. J. LAM
(Rijksherbarium, Leiden)

(Issued 31. XII. 1955)

This is a supplement to Husson & Lam's revision of *Haplolobus* in Blumea 7^2, 1953, 413—458, which will be referred to in the present paper as: "Husson & Lam 1953". There is one new species (*H. mollis*, from Halmaheira) and one new forma (*H. acuminatus*, fa *glabrior*) and the area of the genus has possibly to be extended to include Palau. I would not be surprised at all if it would turn up in some of the Philippines Islands.

Female flowers have been described for the first time of *H. borneensis*. Both in that species and in *H. clementium* the inflorescences have now been found to occasionally possess more or less abortive vegetative buds. This seems more and more a character of generic importance.

Flowers (♂) have for the first time been described for *H. megacarpus*.

H. acuminatus (K. Schum.) H. J. Lam; Husson & Lam, 1953, 427.

NEW GUINEA. West New Guinea, Res. Hollandia, Cycloop Mts, Ifar-Ormu, in old forest along rivulet, 680 m: *N. N. G. For. Serv. (Versteegh) Bw. 927* (HOLL, L), tree 18 m, diam. 0.15 m, young flow. buds yellowish green; 4. XI. '54.

Leaves $3^{1}/_{2}$—$4^{1}/_{2}$-jugate, petiolar medulla with 1—3 resiniferous ducts, leaflets rather narrow for the species. It exactly tallies *NIFS bb 30470* but in the number of resiniferous ducts. This is the highest altitude so far recorded for the species.

NEW GUINEA. West New Guinea, Manokwari, near Sidai, in old forest fairly common, flat country: *N. N. G. For. Serv. (Schram) Bw. 1773*, ster. (HOLL, L), tree 13 m, diam. 0.34 m, 16. III. 1955; nat. n.: mokom.

A sterile specimen but unmistakeably this species. Number of resiniferous ducts 7—10; leaflets pubescent underneath.

fa. **glabrior**, nov. f. — Inflorescentiis (♀) glabris, foliolis subglabris.

NEW GUINEA. West New Guinea, Res. Hollandia, Holtekang, second growth forest on rocky soil, steep slope: *N. N. G. For. Serv. (Brouwer) Bw. 1573* ♀ (HOLL, L), rather frequent, consociate, tree 14 m, diam. 0.3 m, flow. yellow, bark grey, nat. n.: kao, 25. X. '5'4.

This specimen comes nearest to *H. acuminatus*, but is tending towards *H. maluensis* by its entirely glabrous inflorescences (♀, 3—5 cm long) and subglabrous leaves. The best way out seemed to provisionally create a new forma glabrior.

H. robustus H. J. Lam; Husson & Lam 1953, 429.

New Guinea. West New Guinea, Res. Biak, Numfore Isl., nr. Namber in old forest on slope, 8 m: *N. N. G. For. Serv. (Koster) Bw. 1060* (HOLL, L), ster., tree 18 m, bark greyish brown, acid odour, 1. X. 1954, nat. n.: wom.

Closest to this species but leaves only little hairy.

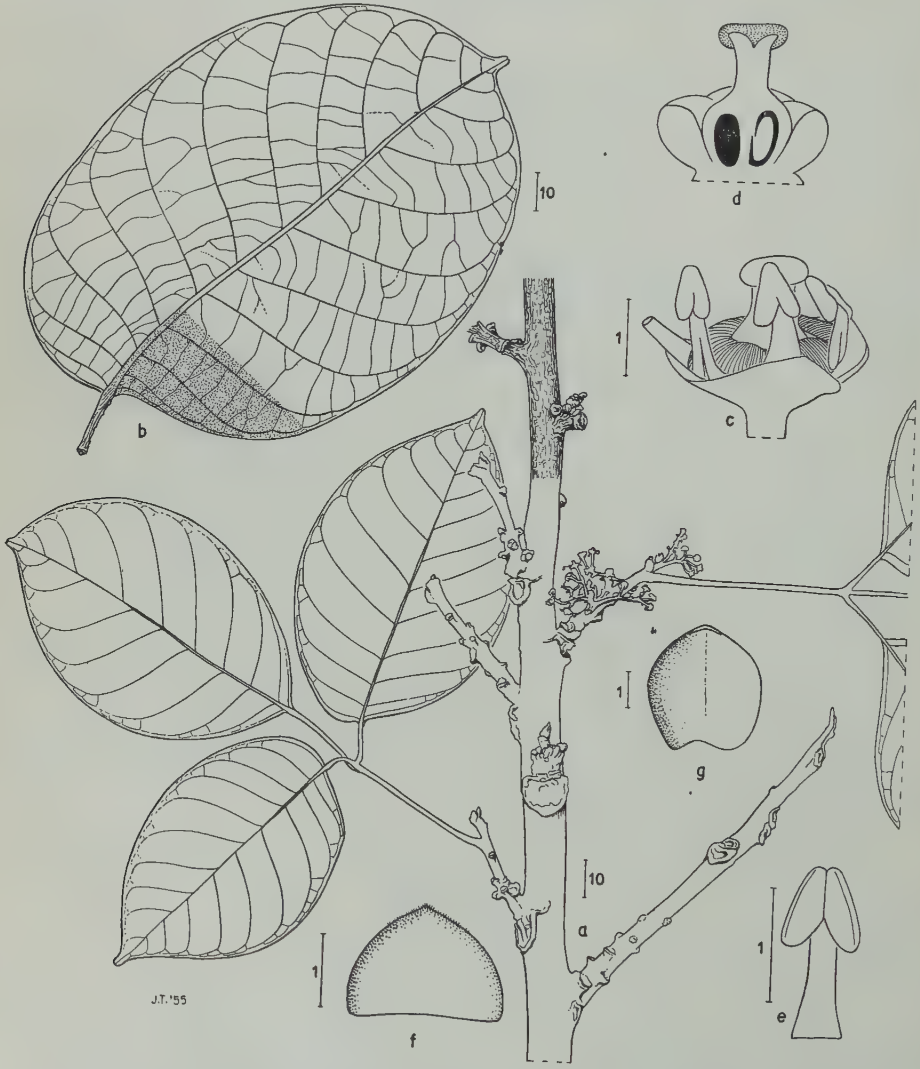


Fig. 1 — *H. mollis* H. J. Lam — a. branchlet with leaves and inflorescences; b. leaflet showing venation; c. ♀ flower without corolla; d. gynaeceum and disc, long. section; e. stamen; f. sepal, outside; g. petal, inside; dimensions in mm — from type specimen.

H.? mollis H. J. Lam, nov. spec. — *Fig. 1.*

Arbor. Ramuli c. 1 cm crassi, verrucosi, medulla aresinosa. *Folia* $1^1/_2$—$3^1/_2$-jugata, petiolo basi ad 0.5 cm crasso, supra cum parte inferiore rhachidis anguste deplanato, haud vel vix sulcato, verruculoso, 3.5—8 cm longo, medulla 8—10 ductis resiniferis percursa; *foliola* elliptica ad obovata, plus minusve bullata, lateralia basi latiora interdum subcordata, plerumque plus minusve obliqua, apice breviter abrupte acuminata, supra glabra, subtus molliter brevipilosa, 7—19 × 5—11.5 cm, petioluli laterales 1—2.2, terminales 2.2—6.2 cm longi; nervi supra vix vel haud, subtus valde prominentes, secundarii 8—15, basales saepe S-formes, omnes curvati, angulo 70°—80° de costa adscendentes, prope margines subarcuatim conjuncti, tertiarii prominuli distanter transversi, reticulatione minuta praecipue supra conspicua. *Inflorescentiae* (♀ tantum videmus) parvae, subpilosae, in ramulis brevibus lateralibus congestae, axillis folii vel foliorum delapsorum insertae, ab ima basi ramificatae, 1.5—2 cm longae, pauciflorae. *Flores* ♀ parvi glabri, (in sicco) 0.3 cm longi, basi 0.2 cm diam.; calyx patens; petala late deltoidea apice minute inflexo-apiculata; discus crassus 6-undulatus, stamina 6 monodynamia c. 0.15 cm longa, filamentis filiformibus, extus discum insertis, antheris subacutis, ut apparet sterilibus; ovarium 0.15 cm altum subglobosum, stylo brevi, stigmate depresso-clavato; flores ♂ ignoti. *Infructescentiae* et fructus ignoti.

MOLUCCAS. Halmaheira, G. Sembilan, in forest, 600 m: *Pleyte 345* ♀ (BO; L, *type*), tree, 20 m, common, flow. yellow, 29. IX. '51.

As far as leaf characters are concerned, this species seems related to *H. moluccanus*, but it is clearly different from that species in the following characters:

	moluccanus	*mollis*
petiolar res. ducts	10—40	8—10
dimensions leaflets	13—38 × 7—18	7—19 × 5—12
prop. length : width ditto ...	2—2.5	1.2—2
pubescence	none	below
length ♀ inflor.	7—18.5	1.5—2

As fruits are so far unknown, the generic identity is not fully certain.

H. celebicus H. J. Lam; Husson & Lam 1953, 435.

PALAU. Todai-yama, in primary forests, 300 m: *Kanehira 1874 ?* (NY), tree, ster., Aug. 1932.

The locality is interesting, but the identification is doubtful. Collectors are invited to look for better material.

H. maluensis (Lauterb.) H. J. Lam; Husson & Lam 1953, 436.

NEW GUINEA. Papua, North. Div., Divinikoari Hill, about 3 km of Divinikoari Village, in fairly low rain forest on summit of low hill, 50 m: *Hoogland 3723* ♀ (CANB, L), tree, 15 m, bole 8 m, diam. 0.3 m, bark grey-brown, orange-brown inside, coarsely flaky, sapwood straw, heartwood yellow-brown, flow. green, 22. VIII. '53, nat. n.: ongo.

H. floribundus (K. Schum.) H. J. Lam; Husson & Lam, 1953, 436.

NEW GUINEA. Papua, North. Div., 2 km NE of Sangara homestead, 10 km W of Popondetta, 200 m, on steep slope of gully: *Hoogland & Womersley 3258* (CANB,

L, LAE), ♀, tree 15 m, bole 8 m, 0.2 m diam., bark pale brown with rather many fairly large horizontal lenticels, flow. green, disc-lobes orange; nat. n.: ongo, joudopu; 8. VII. '53. — West New Guinea, Hollandia, nr Tami, in old forest on flat ground, 2 m alt, fairly frequent: *N. N. G. For. Serv. (Schram) Bw. 1634* (HOLL, L), ster.; tree 32 m, diam. 0.41 m, bark brown, longitudinally furrowed, 17. I. 1955, nat. n.: dja'ato; kenari; same locality and collector *Bw. 1630* (HOLL, L), tree 19 m, bark greyish.

H. megacarpus H. J. Lam; Husson & Lam 1953, 443. — *Fig. 2.*

NEW GUINEA. West New Guinea, Res. Biak, Numfore Isl., nr. Namber, in old forest on slope fairly frequent, 7 m alt.: *N. N. G. For. Serv. (Koster) Bw. 1015* (HOLL, L) ♂ *type*, tree 15 m, diam. 0.38 m, bark d. brown, flow. buds green, 22. IX. 1954, nat. n.: nas; same locality and collector *Bw. 1004* (HOLL, L), ster.

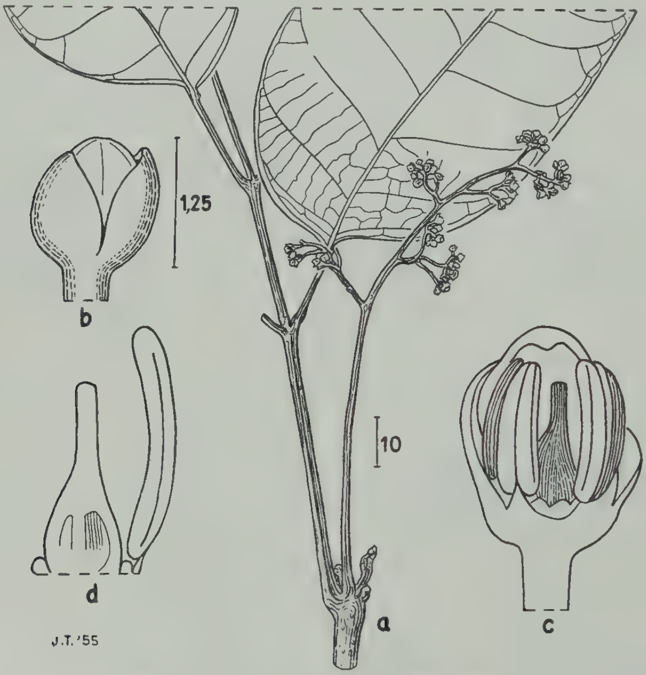


Fig. 2 — *H. megacarpus* H. J. Lam — a. ♂ inflorescence; b. ♂ flower outside; c. ditto, long. section; ditto, showing stamen, disc and pistillum; dimensions in mm — from ♂ type specimen.

Though the type specimen (*Beccari 2225*) bears only fruits, the vegetative characters of the above specimens are so strikingly like those of the type that there seems little reason for doubt regarding their identity.

Bw 1015 is proposed to serve as the ♂ type: *Inflorescentiae* ♂ axillares glabrae paniculatae (unam tantum videmus) c. 11 cm longae, ramuli laterales usque ad 2 cm longi, ultimi cymosi, bracteis minutis triangularibus. *Flores* ♂ glabri 0.15 cm longi; calyx trifidus sepalis fere liberis; petala apice inflexo-apiculata; stamina 6, antheris 0.1 cm longis, filamentis breviter deltoideis extus discum liberis; discus annularis 6-undulatus pro genere minutissimus; pistillum sterile vasculiforme staminibus paulo brevius triloculare.

The flowers are unusual for the genus in so far as the sepals are almost free, the disc is exceptionally shallow, the filaments very short (in old buds), and the anthers very long.

H. clementium A. M. Husson; Husson & Lam, 1953, 449.

NEW GUINEA. West New Guinea, Res. Hollandia, Cycloop Mts, Ifar-Ormu, in old forest on slope, 700 m: *N. N. G. For. Serv. (Versteegh) Bw. 935* ♀ (HOLL, L), tree about 25 m, diam. 0.2 m, flow. yellowish-green, fruit green; same locality, 600 m: *Van Royen 3782* ♀ (HOLL, L), tree 15 m, bole 8 m, diam. 0.3 m, buttresses 1 × 0.5 × 0.15 m, flow. buds green, lvs olive green with brownish nerves, 14. X. '54.

The two specimens are identical mutually and very close to the type, though somewhat tending towards *Docters van Leeuwen 10800*. The leaflets are of the smaller type, about 3—14 by 2—5.2 cm, with 6—11 secondary nerves and 1—3 petiolar resiniferous ducts. The leaf apex is more or less long acuminate (acumen 0.5—2 cm). The ♀ inflorescences not rarely bear an obsolete vegetative bud. They are few-flowered and 0.5—3 cm long.

H. aneityensis (Guill.) A. M. Husson; Husson & Lam, 1953, 449.

SOLOMONS, without further indication of locality, received from Chief. For. Off. by letter No. D. 6299, sterile (K); San Christoval, same sender and letter (K).

Though there are some leaves only there is no doubt that they represent this characteristic species.

H.? borneensis H. J. Lam; Husson & Lam 1953, 452 — *Fig. 3.*

BORNEO. Brit. N. Borneo, Mt Kinabalu, Penibukan W. ridge, 1500 m: *J. & M. S. Clemens 50337* ♀ (BM; L, *type* ♀), tree, 0.2 m in diam., tall, flow. yellowish, 17. XI. 1933.

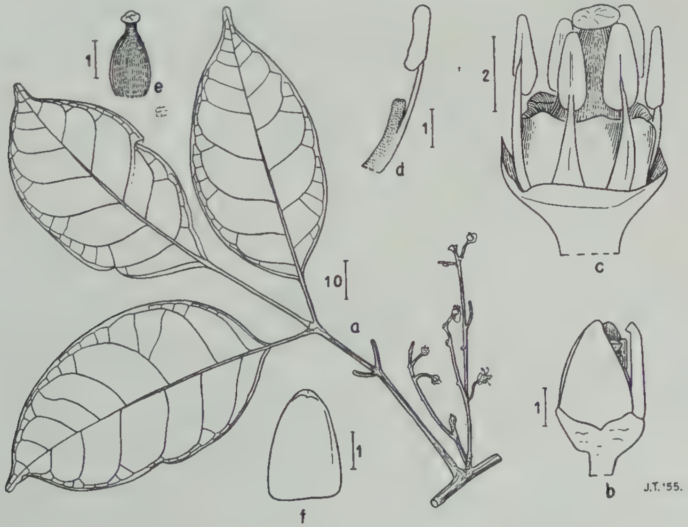


Fig. 3 — *H. borneensis* H. J. Lam — a. leaf and inflorescence; b. ♀ flow. outside; c. ditto, without corolla; d. long. section of disc and stamen; e. ovary; f. petal inside; dimensions in mm — from ♀ type specimen.

The first female specimen recorded and therefore proposed as the ♀ type: *Inflorescentiae* ♀ axillares vel laterales, laxae, saepe gemma vegetativa (abortiva ?) munitae, glabrae, pauciflorae, plerumque ab ima basi ramificatae, 3—6 cm longae, bracteae caducae; *flores* pro genere magni, 0.3—0.35 cm longi, glabri; petala 0.3 cm longa, 0.2 cm lata, oblongo-deltoidea, apice minute inflexo-apiculata; stamina 6 monodynamia 0.2 cm longa, antheris (sterilibus ?) oblongis, filamentis basi dilatatis disco 6-undulato 0.1 cm alto plus minusve pro dimidio extus adnatis; ovarium 0.2 cm altum vasculiforme stylo brevi stigmate deplanato coronatum.

The female inflorescences are about half as long as the male ones. Despite a slight difference in the venation type, which is hard to describe, the vegetative parts match those of the male type very well. There are about 3 res. ducts in the petiolar medulla. Fruits are still unknown. As moreover the vegetative characters resemble somewhat those of *Santiria apiculata* Benn., there is still some doubt as to the generic identity.

FLORAE MALESIANAE PRECURSORES

XI. NEW TAXA IN CANARIUM

by

P. W. LEENHOUTS

(Flora Malesiana, Leiden)

(Issued 31. XII. 1955)

English diagnoses of the following new taxa will before long be published in Flora Malesiana, I, 5^2; with the exception of *C. pseudosumatranum*, the Latin diagnoses are exclusively based on the type-collection.

The abbreviations used are as follows:

BS = Bureau of Science, Manila
BW = Boswezen, Dutch New Guinea
FRI = Forest Research Institute, Bogor
KEP = Conservator of Forest, Kepong
NGF = New Guinea Forestry, Lae
PNH = Philippine National Herbarium, Manila
SF = Singapore Fieldnumber.

The herbarium-abbreviations are as proposed by Lanjouw & Stafleu, Index Herbariorum 1, ed .2 (1954).

I am indebted to Dr R. C. Bakhuizen v. d. Brink jr for the Latin translations.

The drawings have been made by Miss R. van Crevel and Mr H. J. Tammel, artists of the Flora Malesiana Foundation and the "Rijksherbarium" respectively.

Sect. Canarium

1. Canarium caudatum King

f **auriculiferum**, nov. f. — Stipulae auriculiformes, in petiolo insertae.

Typus: *Haviland 2877* (♂), Borneo, Sarawak, near Kuching (Holotype in SING; Isotypes in BM, K, L, SAR).

Paratypes: Sumatra: *Buwalda 6773; FRI. bb. 27564* (= *Buwalda 6644*); *Rahmat si Boeea 5044*; Borneo: *BS 2466; Haviland & Hose 3275; Hose 183, 262, 288.*

2. Canarium denticulatum Bl.

Ssp. **kostermansii**, nov. subsp. — Differt a ssp. *denticulato* praecipue characteribus sequentibus: Omnes partes pilis subpersistentibus ferrugineo-pubescentes. Folia 3—4-jugata. Foliola subtus et in costa utrimque dense pubescentia; margines dense serrati. Inflorescentiae laxae, floribus pluribus quam in subspecie typica.

Typus: *Kostermans 5226* (♀), E. Borneo, Sg. Menubar region, alt. 30 m (Holotype in L; Isotypes in BM, BO, K).

Paratypes: E. and NE. Borneo: *FRI. bb. 10751; Kostermans 5112, 5300, 5395, 5907, 5921;* P. Laut: *FRI. bb. 12237.*

Named in honour of Dr A. J. G. H. Kostermans, who recently made very fine collections in E. Borneo.

3. **Canarium indicum** L.

Var. **platycerioideum**, nov. var. — Differt a var. *indico* praecipue characteribus sequentibus: Stipulae orbiculares, 8—12 × 10—14 cm, subcoriaceae, marginibus undulatis. Foliola obliquo-ovata, c. 35 × 15 cm, coriacea.

Typus: *FRI. bb. 32637* (ster.), West New Guinea, Vogelkop, Tisa near Steenkool (Holotype in BO; Isotype in L).

Paratypes: West New Guinea, Vogelkop: *Beccari PP 568; Kostermans 265.*

The name *platycerioideum* refers to the stipules, which are resembling the basal leaves of *Platycerium.*

4. **Canarium kaniense** Laut.

Var. **globigerum**, nov. var. — Differt a var. *kaniense* praecipue a characteribus sequentibus: Fructus globosi 5 × 5 cm, exocarpium durum, pericarpium crassum fibrosum, pyrena acute 3-alata; stipularum margo fimbriatim dentatus; apex foliolorum longe et anguste (usque ad 30 × 1 mm) acuminatus.

Typus: *Hoogland 3727* (fr.), East New Guinea, Northern Div., 3 km N. of Divinikoari village, alt. 30 m (Holotype in L; Isotype in CANB).

The taxonomic status of this variety is not quite certain. In its vegetative characters — though they are very conspicuous — the present variety is linked to var. *kaniense* by intergrades. For the time being, var. *globigerum* seems to be sharply defined by its peculiar fruits. As both varieties are still very incompletely known, it is possible that they will show to be either good, though closely related, species, or mere extreme forms, linked by a series of intergrades. Geographically and altitudinally they are not separated.

5. **Canarium kinabaluense**, nov. sp. — *Fig. 1.*

Arbor. Ramuli 0.5—0.8 cm diam., glabrescentes; medulla cylindro peripherali e fasciculis vasorum minutis constituto suffulta. *Stipulae* subpersistentes, petioli basi insertae, suborbiculares ad ellipticae, c. 2 × 1.5 cm, subcoriaceae, glabrae, integrae. *Folia* 2—3-jugata, glabra. Foliola elliptico-ovata, 10—16 × 5—8 cm, coriacea; basis rotundata ad late cuneata; margo prope apicem crenulatus; apex sat abrupte et late acuto-acuminata; nervi utrimque 9—14, conspicue arcuatim conjuncti. *Infructescentiae* terminales, laxe paniculatae, 10—20 cm longae, glabrescentes, c. 12 fructus gerentes; calyx crateriformis 1.25 cm diam., disci annulari fimbriati residuis munitus, stamina libera disco haud connata. *Fructus* anguste fusiformes, in sectione transversa triangulares, basi et apice acuti, 6—6.5 × 2—3 cm, glabri; pyrena rotundato-triangularis, apice acute 3-costata; valvae 3 mm crassae. Semen 1; loculi steriles plus minusve valde reducti et superficiem versus translati.

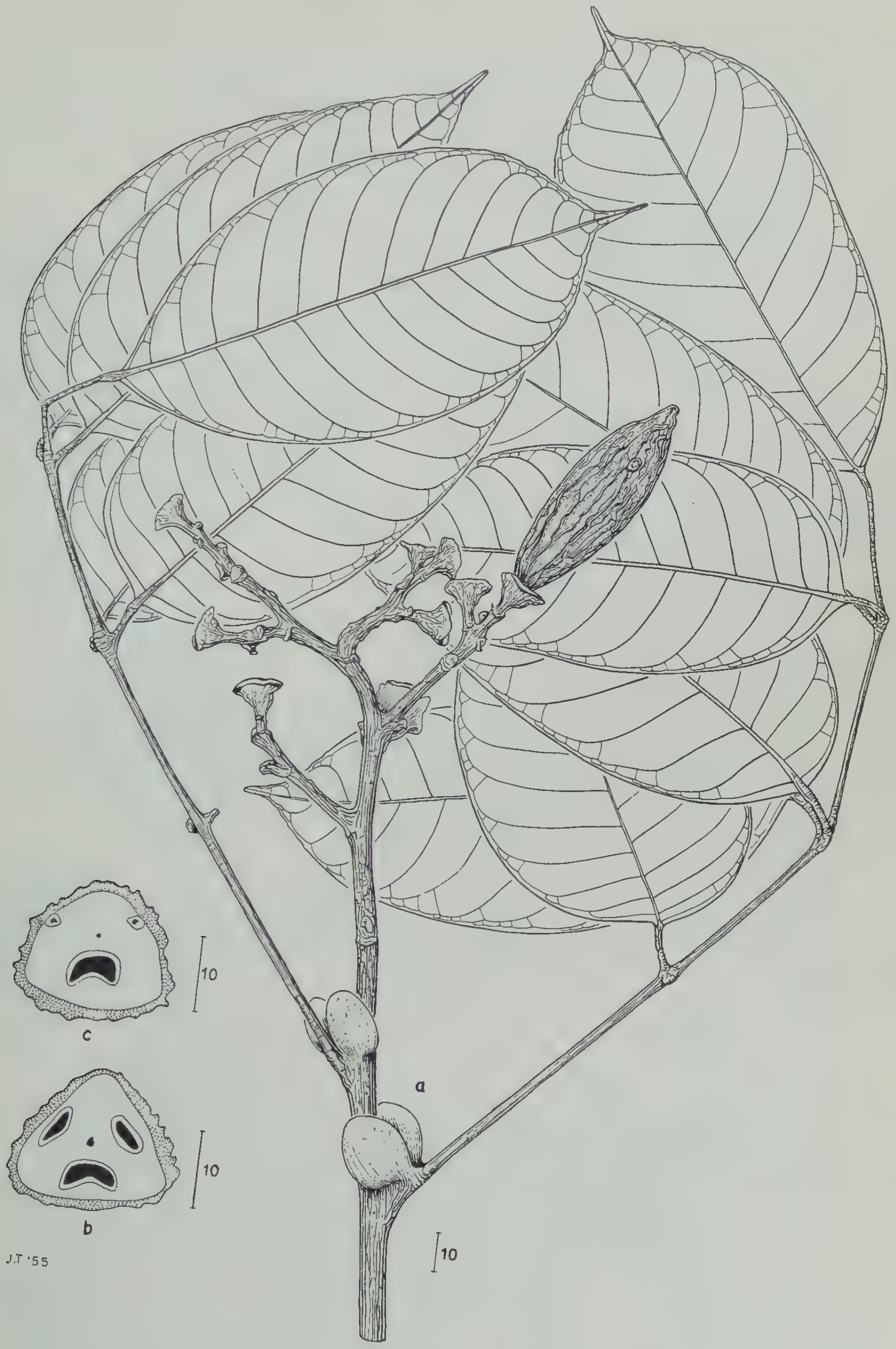


Fig. 1. — *C. kinabaluense* Leenh. — a. branchlet with leaves and infructescence; b, c. cross sections of fruits (*Ramos 1698*).

Typus: *Ramos 1698* (fr.), North Borneo, Sandakan vic. (Holotype in L; Isotypes in A, BO, BM, K, P).

Paratypes: North Borneo, Mt Kinabalu: *Clemens 31612, 31807, 51315.*

This species is related to *C. patentinervium* Miq. and *C. divergens* Engl., from which it conspicuously differs by its stipules.

6. **Canarium lamii,** nov. sp. — *Fig. 2.*

Arbor 20 m × 50 cm. Ramuli 6—7 mm diam., leprosi; medulla cylindro peripherali e fasciculis vasorum minutis constituto suffulta. *Stipulae* semipersistentes in petiolo 1—1.5 cm a basi insertae, decurrentes, obliquo-obovatae, 1.25—2 × 1 cm, rigidiusculae. *Folia* 3-jugata, glabra. Foliola ovata ad lanceolata, 11—18 × 6—7 cm, coriacea; basis subobliqua, rotundata; margo integer; apex subabrupte breviter et obtuse acuminatus; nervi utrimque 10—12 (angulo 60—80°), moderatim curvati, prope marginem plus minusve distincte arcuatim conjuncti; nervi tertiarii secundarii paralleli conspicui. *Infructescentiae* terminales, parvae, monocarpae; calyx patens, orbicularis, 1.75 cm diam. *Fructus* ovoidei 6 × 4 cm glabri; pericarpium 5—7.5 mm crassum fibrosum; pyrena laevis, apice rostrata, in sectione transversa rotundato-triangularis; valvae 7.5 mm crassae, durissimae. Semina 1—2.

Typus: *BW. 1609* (fr.), West New Guinea, Holtekang near Hollandia, alt. 2 m (Holotype in L).

Apparently related to *C. harveyi* Seem., a Melanesian species, which occurs from the Solomon Is to Samoa.

I have named this species in honour of Prof. Dr H. J. Lam, who has published some important papers on the morphology and taxonomy of Malaysian Burseraceae, and who, moreover, has done a great deal for the advancement of study in New Guinean botany.

7. **Canarium maluense** Laut.

Ssp. **maluense**

f. **celebica**, nov. f. — Differt a f. *maluense* praecipue a characteribus sequentibus: Stipulae in conjunctione ramulorum cum petiolis insertae. Foliola 9.5—16 × 4—6.5 cm, 2—2.5 × longiora quam lata; nervi utrimque c. 15.

Typus: *FRI. bb. 13573* (♂), Celebes, Malili, Lampea, c. 50 m alt. (Holotype in L; Isotype in BO).

Paratypes: Central Celebes: *FRI. Cel./II-413; Kjellberg 1837, 2012.*

f. **bullata**, nov. f. — *Fig. 5 b.* — Differt a f. *maluense* praecipue characteribus sequentibus: Foliola coriacea, bullata, nervatione subtus prominente, 15—17 × 8—10 cm, 1.5—2 × longiora quam lata; subtus plus minusve dense tomentosa. Stipulae in conjunctione ramulorum cum petiolis insertae. Fructus 1-spermi, loculis sterilibus 2 fere complete reductis.

Typus: *Brass 13136* (fr.), West New Guinea, Idenburg River, Bernhard Camp, 900 m alt. (Holotype in L; Isotype in A).

Paratypes: West New Guinea: *Brass 12586; FRI. bb. 31112, 31127.*

Ssp. **borneense**, nov. subsp. — Differt a ssp. *maluense* praecipue characteribus sequentibus: Nervi utrimque 10—12(—15). Inflorescentiae ♂ laxe paniculatae pauciflorae. Flores ♂ 8—9 mm longi. Stamina basi

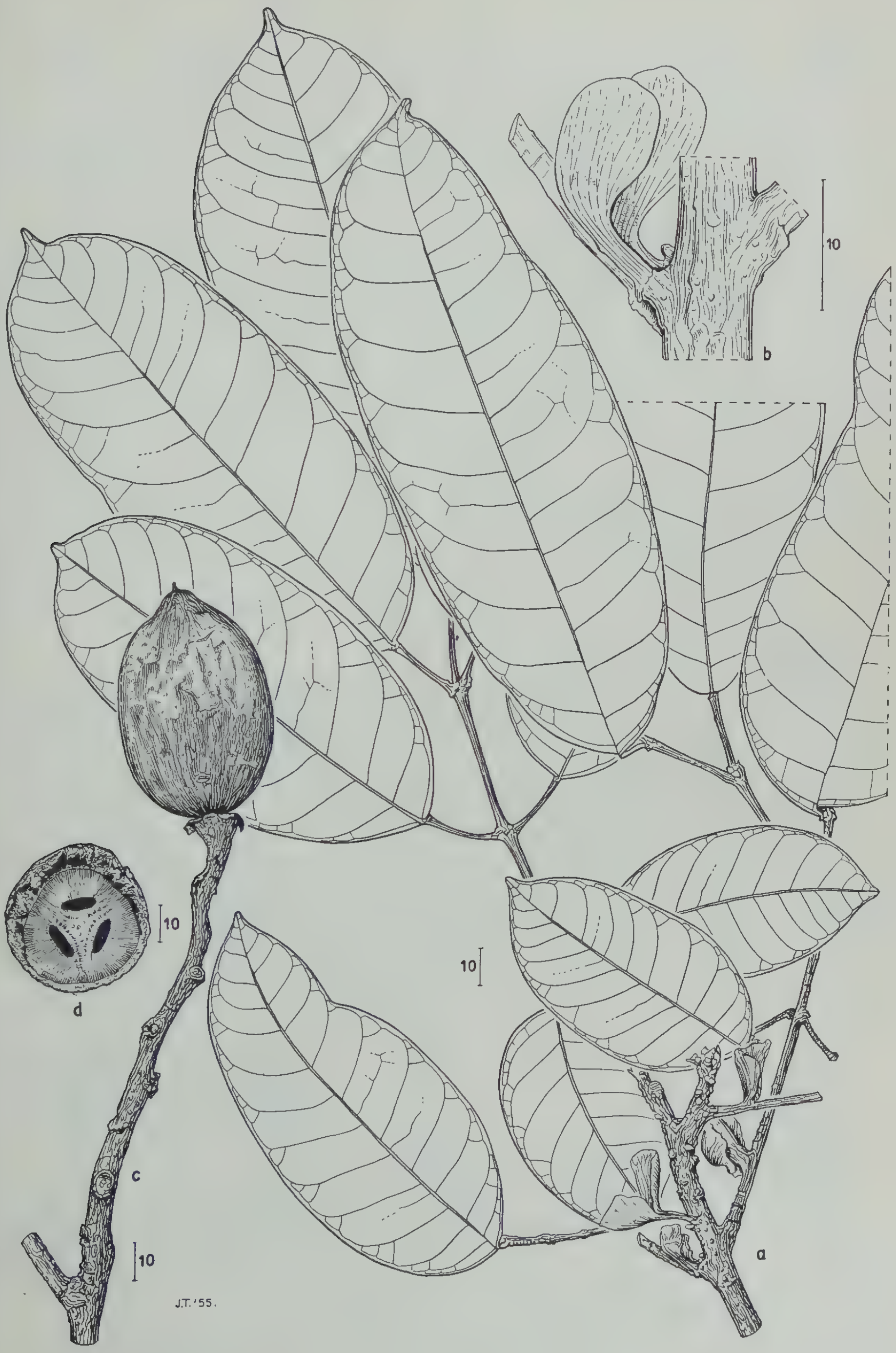


Fig. 2 — *C. lamii* Leenh. — a. branchlet with leaves; b. stipules; c. infructescence with fruit; d. cross section of fruit (*BW. 1609*).

confluentia. Discus pistilloideus sensim in stylum reductum filiformem angustatus.

Typus: *Kostermans 7525* (♂), Borneo, Peak of Balikpapan, alt. 640 m (Holotype in L; Isotypes in BO, K).

Paratypes: NE. Borneo: *Kostermans 7148, 7362, 7591.*

This subspecies is interrelated between the western *C. patentinervium* Miq. and the eastern *C. maluense* f. *celebica.*

8. **Canarium megacarpum,** nov. sp. — *Fig. 3.*

Arbor 35 m × 40 cm. Ramuli 1.2 cm diam., glabrescentes; medulla fasciculis vasorum multis minutis sparsis suffulta. *Stipulae* caducae in petioli basi insertae, reniformes, 5 × 8 mm, dense tomentosae, margine denticulatae. *Folia* 4—5-jugata. Foliola ovata ad elliptico-oblonga, 15—19 × 5—8.5 cm, subcoriacea, supra in costa et subtus in nervis omnibus breviter fulvo-tomentosa; basis rotundata ad truncata; margo integer; apex subabrupte et breviter acuto-acuminata; nervi utrimque 17—22 (angulo 55°), recti ad subcurvati, in parte apicali solum distincte arcuatim conjuncti; nervi tertiarii plerumque transversi densi. *Fructus* ovoidei, in sectione transversa triangulares, 8 × 5 cm, glabri; pericarpium 5 mm crassum fibrosum; pyrena acute 3-alata, valvis concavis, scaberulis, 3—3.5 mm crassis. Semina 2; loculus sterilis moderatim reductus.

Typus: *FRI. bb. 22547* (fr.), West New Guinea, W. Rauna (Holotype in BO).

9. **Canarium perlisanum,** nov. sp.

Arbor c. 10 m alta. Ramuli 0.6 cm diam. glabri; medulla cylindro peripherali e fasciculis vasorum minutis constituto suffulta. *Stipulae* caducae in petiolo insertae 0.5—1 cm a basi remotae, cicatricibus 3 mm longis. *Folia* 2-jugata, glabra. Foliola subsessilia, late elliptica, 11—16 × 5—7 cm, chartacea; basis rotundata; margo praecipue apicem versus crenulatus; apex sensim angustatus longe et late obtuso-acuminatus; nervi utrimque 14—18 (angulo c. 50°), recti, prope marginem sensim arcuatim conjuncti. *Inflorescentiae* ♂ axillares, anguste paniculatae, usque ad c. 13 cm longae, glabrescentes, glomerulis pro majore parte subsessilibus. Bracteae concavae. *Flores* ♂ 8 mm longi, extus parce tomentosi. Calyx 4 mm altus. Stamina 6, glabra, filamentis pro dimidio connatis. Discus cylindricus 6-lobatus, 1 mm altus, apice conica parce pilosus, canali centrali suffultus; pistillum abest.

Typus: *SF. 35311* (♂), Malay Peninsula, Perlis, Kaki Bukit, alt. 75 m (Holotype in SING).

This species apparently belongs in the relationship of *C. littorale* Bl.

10. **Canarium piloso-sylvestre,** nov. sp.

Canario sylvestri Gaertn. multo affinis, sed differt characteribus sequentibus: Ramuli et inflorescentiae pilis subpersistentibus dense ferrugineo-lanati. Stipulae usque ad 8 mm a basi in petiolo insertae, auriculiformes ad lingulata, usque ad 6 × 3.5 mm. Foliola subtus sparse pilosa. Flores ♂ 8 mm longi. Stamina 6—3.

Typus: *Aet (exp. Lundquist) 138* (♂), West New Guinea, Mc Cluer Bay, Anakasi near Babo, alt. 50 m (Holotype in L; Isotype in BO).

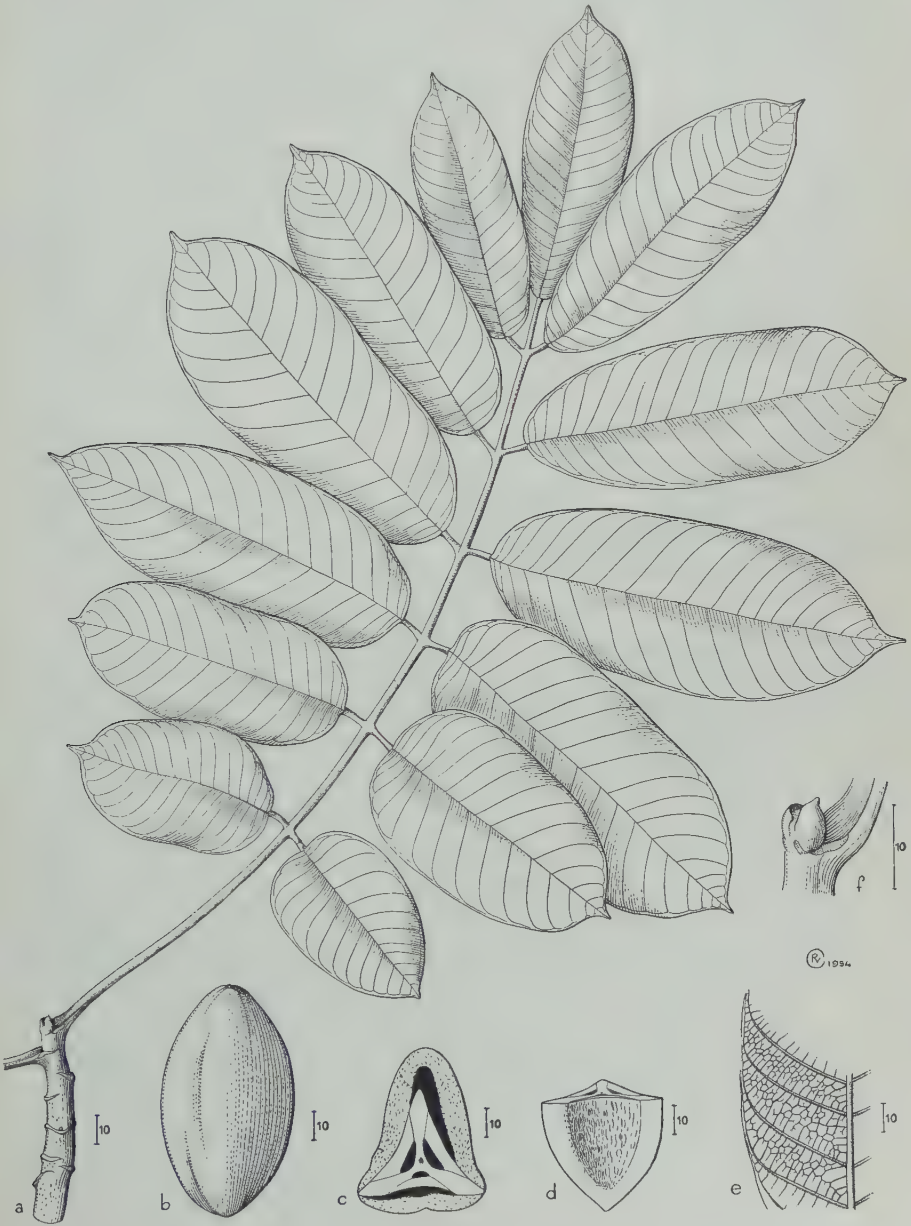


Fig .3. — *C. megacarpum* Leenh. — a. branchlet with leaf; b. fruit; c. ditto, cross section; d. outer surface of the pyrene; e. part of leaflet, lower surface; f. terminal bud, enveloped by the stipules of the next, not yet unfolded leaf. (*FRI. bb. 22547*).

11. Canarium salomonense B. L. Burtt

Ssp. **papuanum**, nov. subsp. — *Fig. 5 f.* — Differt a ssp. *salomonense* praecipue characteribus sequentibus: Stipulae subcaducae. Folia 3-jugata. Foliola elliptico-ovata, 7—8 × 4—4.5 cm; acumen quam in subspecie typica minus. Fructus parviusculi, 3.5 × 2.25 × 1.5 cm, subcompressi; pericarpium plus minusve fibrosum; valvae durissimae, usque ad 5 mm crassae; loculi steriles fere complete reducti.

Typus: *Hoogland 3844* (fr.), East New Guinea, Northern Div., foothills of Hydrographer's Range near new Inota village, alt. c. 125 m (Holotype in L; Isotype in CANB).

Paratypes: East New Guinea, Northern Div.: *Hoogland 3823, 3877; NGF. 2099.*

12. Canarium vulgare, nov. sp. — *C. commune* (non L.) H. J. Lam, Bull. Jard. Bot. Btzg III, 12 (1932) 509; and of nearly all modern authors.

Arbor. Ramuli c. 0.5 cm diam., laeves, canescentes; medulla fasciculis vasorum multis pro parte peripheralibus suffulta. *Stipulae* subcaducae in conjunctione ramulorum cum petiolis insertae, ellipticae, c. 1.5 × 1 cm, subpulverulentes, apice rotundatae, margine integrae. *Folia* 2—3-jugata, glabra. Foliola ovata ad oblonga, 11—14 × 4—6 cm, chartacea; basis cuneata; margo integer; apex sensim ad subabrupte acuminatus, acumine obtuso, 1—1.5 cm longo; nervi utrimque 12—15, distincte arcuatim conjuncti. *Infructescentiae* terminales; calyx fructifer patens, orbicularis, 1 cm diam., margine undulato. *Fructus* ovoideus, in sectione transversa subtriangularis, 3.5 × 2 × 1.25 cm; loculus fertilis 1; loculi steriles 2 sat multo reducti.

Typus: *Becking 142* (fr.), Bali, Tjandikusuma, alt. 20 m (Holotype in L; Isotype in BO).

Paratypes: probably wild: Kangean: *C. A. Backer 27830, 27954, 29608; Dames 22;* Bawean: *Karta 1;* Flores: *FRI. bb. 9638;* Timor: *Van Steenis 18204;* Wetar: *FRI. bb. 27244;* Tanimbar: *Buwalda 4476; FRI. bb. 24355;* N.-Celebes: *Forsten 438; FRI. bb. 15050, 32752;* Saleijer: *Docters van Leeuwen 1551; FRI. bb. 24114;* Talaud: *H. J. Lam 3131;* Morotai: *FRI. bb. 24571, 33753, 33852, 33859, 33863, 33917; H. J. Lam 3457;* Sula: *FRI. bb. 29787;* Ceram: *FRI. bb. 23043;* Banda: *Lauterbach 3038; Reinwardt (herb. L 898.319—149);* Aru: *Beccari herb. 2166, herb. 2169; FRI. bb. 25484;* Moluccas s. loc.: *De Vriese & Teysmann (herb. L 898 319—145).*

probably cultivated: *d'Alleizette herb. 1161; C. A. Backer 22, (herb. U 11313 & 11314); Bakhuizen v. d. Brink jr. 1582; Bakker jr. 20; Blume 667, (herb. L 898.319—144 & 146); Boerlage (herb. L 908.352—155 & 679); E. G. & N. L. Britton 9326; Broadway (herb. L 910.298—16); BS. 29255, 85684; Burmann 149; Cantley 2681; Chevallier 31334; Clemens 22427; Commerson 592; Dorgelo 1708; Evrard 2374; Fairchild 3702; Forbes 6, 1208; Greenway 2884; Griffith 170; Henderson 1360; Van Heurn (herb. L carp 11760/2); Hooker 837; herb. Hooker (herb. CAL 78103); Hort. Bot. Bogor 42, 51, VI B 66; Hort. Bot. Pamplemousses 108, 150; Hort. Bot. Singapore H 64; Hullett 137; Jack 4199, 4790; Junghuhn 59, (herb. L 908.247—222), (herb. U 32921); Kanehira 848; Karta 198; Kehding 1014; Koorders 917 β, 975 β; Kuntze 5086; Lahaie 153, 193; H. J. Lam 2297; Lindeman 4486; Long 176; L. H. MacDaniels 413; Macrae 332; Nur 195; Parham 1540; PNH. 380, 394; Popta 603/198 A, B & C; Proefstation v. d. Java-suikerindustrie 305a & b; Reinwardt (herb. L 898.319—153 & 330); Ridley 6895, (herb. CAL 78157); Rock 17140; herb. Van Royen (herb. L 898.319—158); SF. 4161, 34847; Volkens 35; De Voogd 667; De Vriese 45; Wallich 8047, 8493; D, E & F; Warburg 2059; Wawra 1247; Wetmore & Abbe 286; Wight 387; Wilder 462, 860; Zollinger Pl. Jav. 2994.*

Sect. Pimela DC. Prodr. 2 (1825) 80.

13. **Canarium acutifolium** (DC.) Merr.

Var. **celebicum**, nov. var. — Differt a var. *acutifolio* praecipue characteribus sequentibus: Ramuli solidi. Stipulae in petiolo 1—5 mm a basi insertae, usque ad 1.5 cm longae. Foliola oblonga ad lanceolata, 10—20 × 4—6 cm; apex sensim angustatus; nervi utrimque 20—25. Inflorescentiae et flores sparse tomentosi. Stamina 6. Discus et pistillum pilosi.

Typus: *FRI. bb. 28279* (♀), North Celebes, Menado, Palu, Sidaunta, alt. 400 m (Holotype in L; Isotypes in A, BO, SING).

Paratypes: Central Celebes: *FRI. Cel./V-190 & 310.*

14. **Canarium asperum** Benth.

f. **triphyllum** H. J. Lam (Ann. Jard. Bot. Btzg 42, 1932, 211, nom. provis.), nov. f. — Folia 1(—2)-jugata. Foliola usque ad 14 × 7 cm, rigida. Spicae rigidae. Fructus c. 10 × 7 mm.

Typus: *H. J. Lam 3505* (fr.), Moluccas, Morotai, alt. 100 m (Holotype in L; Isotype in BO) .

Paratypes: S. Borneo: *Kostermans 4678;* Morotai: *FRI. bb. 33861, 33918; Main & Aden 946;* Ternate: *Beguin 2a.*

15. **Canarium australianum** F. Muell.

Var. **glabrum,** nov. var. — Differt a var. *australiano* foliolis subtus glaberrimis.

Typus: *Specht 571* (fr.), Australia, Northern Territory, Gulf of Carpentaria, Bickerton Island, South Bay (Holotype in L; Isotypes in K, LAE).

Paratypes: Australia, Northern Territory and Queensland: *Brass 2005; R. Brown 5425; Michael 1360; Prager 28; Schomburgk 116; Schultz 586; Specht 1074; T. A. Stephenson 700; D. F. Thomson 18; Thurston 268; C. T. White 11682;* New Guinea, Papua: *Brass 6561, 8425.*

16. **Canarium cestracion,** nov. sp. — *Fig. 5 g.*

Arbor c. 20 m alta. Ramuli 8 mm diam., glabri; medulla fibrosa fasciculis vasorum multis sparsis minutis percursa. *Stipulae* caducae in ramulis prope petioli basim insertae. *Folia* 3—5-jugata, glabra. Foliola late lanceolata, 11—20 × 4.5—7 cm, rigido-chartacea; basis rotundata ad late acuta; margo integer; pars apicalis acuta, sensim acuminata, acumine brevi, lato et obtuso; nervi utrimque 10—12 (angulo 65—75°), recti ad subcurvati, sed marginem versus conspicue curvati, et c. 2—3 mm a margine plus minusve distincte arcuatim conjuncti. *Infructescentiae* axillares, racemosae, 15—20 cm longae, fructibus 1—3 gerentes, glabrae; calyx patens 3-angularis, 6—8 mm diam., lobis reflexis. *Fructus* elliptici, basi et apice acuminati, in sectione transversa triangulares, 4—4.5 × 2.5—2.75 × c. 1.5 cm, glabri; pyrena profunde sulcata, 6-costata, costis multo prominentibus; valvae 3.5 mm crassae. Semina 1—2; loculi fertiles radialiter angusti, steriles fere complete reducti.

Typus: *Carr 12796* (fr.), New Guinea, Papua, Koitaki, alt. 500 m (Holotype in SING; Isotypes in BM, K, L).

This species is possibly related to *C. polyphyllum* K. Schum.

Named after the fish-genus *Cestracion,* which the fruit resembles in shape.

17. **Canarium hirsutum** Willd.

Ssp. **hirsutum**

Var. **beccarii**, nov. var. — Differt a var. *hirsuto* praecipue characteribus sequentibus: Ramulorum medulla fasciculis vasorum multis sparsis

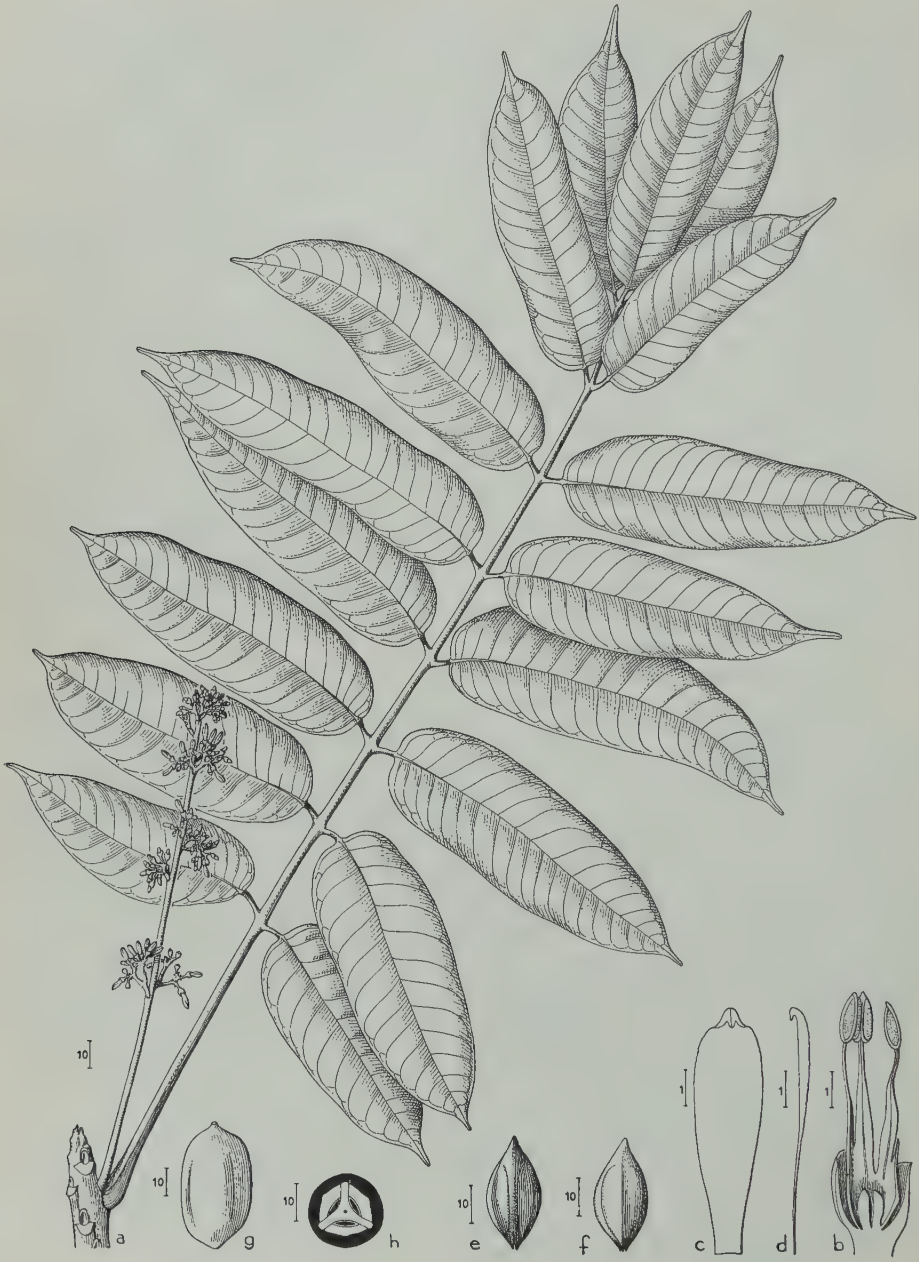


Fig. 4. — *C. pseudosumatranum* Leenh. — a. branchlet with ♂ inflorescence and leaf; b. longitudinal section of ♂ flower, corolla removed; c. petal of ♂ flower, seen from within; d. ditto, longitudinal section; e, f. pyrene; g. fruit; h. ditto, cross section (a—d from *KEP. 55781*, e—h from *KEP. 20476*).

minutis suffulta. Stipulae 0. Foliola subtus in nervis sparse rigido-pilosa; nervi utrimque 14—16. Fructus ellipsoideus, in sectione transversa circularis, apice acutus, 28—30 × 17—19 mm; pyrena rostrata, gibbosa, costis 6-acutis; monospermus.

Typus: *Beccari herb. 2171* (fr.), SE. Celebes, Lepo-Lepo near Kandari (Holotype in FI).

Paratypes: same locality: *Beccari herb. 2169a, 2170, 2172.*

Named in honour of the great Italian botanist O. Beccari.

Ssp. **multicostulatum**, nov. subsp. — *Fig. 5 e.* — *C. hirsutum* Willd. *f. ζ (multicostulatum)* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 212, nom. provis. — *C. multijugum* H. J. Lam, *l. c.*; Bull. Jard. Bot. Bteg III, 12 (1932) 476, t. 11 f. 70. — Differt a ssp. *hirsuto* praecipue characteribus sequentibus: Inflorescentiae sat late paniculatae. Pyrena ut in malo persico profunde et irregulariter ruminata; fructus sparse pilosi ad fere glabri.

Typus: *Beguin 2245* (fr.), Moluccas, Halmahera, W. Pitu, alt. 60 m (Holotype in L; Isotype in BO) .

Paratype: Halmahera: *Beguin 2106.*

Var. **leeuwenii**, nov. var. — *C. hirsutum* Willd. f. ϑ *(Leeuwenii)* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 212, nom. provis. — Differt a var. *multicostulato* praecipue characteribus sequentibus: Stipulae adsunt. Nervi utrimque 14—15. Fructus subglobosi, 3.5 × 2.75 cm; pericarpium 4 mm crassum, fibrosum.

Typus: *Kajewski 1931* (fr.), Solomon Islands, Bougainville, Kugumaru, Buin, alt. 150 m (Holotype in L; Isotypes in A, BISH, BO, BRI, G, P, SING).

Paratype: West New Guinea: *Docters van Leeuwen 11275.*

18. Canarium kostermansii, nov. sp. — *Fig. 5 a.*

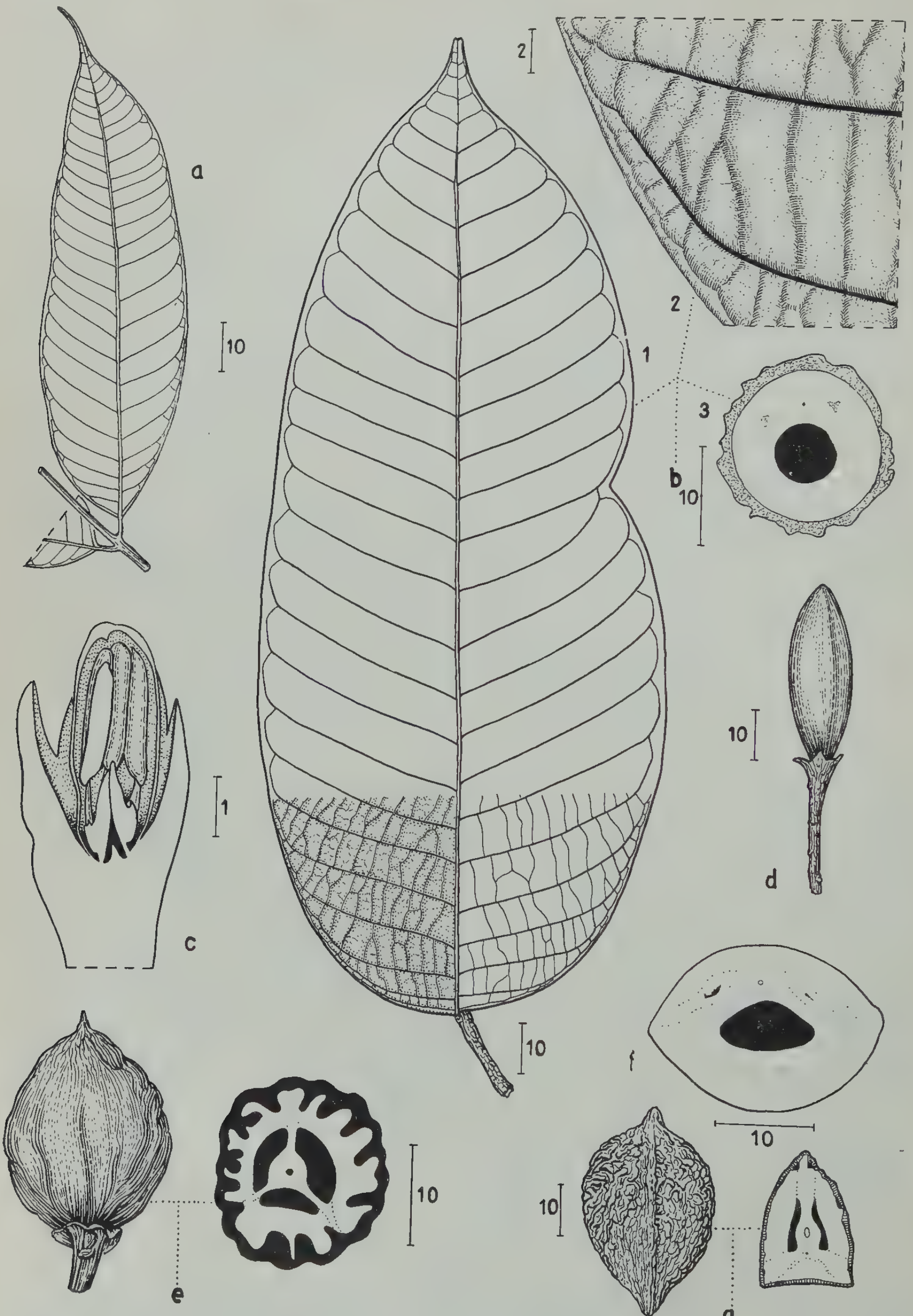
Arbor 30 m × 60 cm. Ramuli usque ad 1 cm diam., ferrugineo-tomentosi; medulla cylindris 2 concentricis e vasorum fasciculis constitutis suffulta. *Stipulae* caducissimae, in petiolo 3—5 mm a basi insertae, subulatae, c. 6 mm longae, cicatricibus prominentibus. *Folia* 6—7-jugata. Foliola lanceolata, 10—12 × 3—3.5 cm, sat rigide chartacea, glabra; basis subinaequilateralis, late cuneata; margo integer; apex sensim acuminatus, acumine acuto, usque ad 15 × 3—4 mm; nervi utrimque 22—25 (angulo c. 60°), recti, marginem versus subcurvati, margine valde propinquo abrupte arcuatim conjuncti. *Inflorescentiae* ♀ axillares racemosae 10—15 cm longae sparse tomentosae glabrescentes. *Flores* ♀ 12 mm longi receptaculo cavo. Calyx 9 mm altus. Stamina 4.25 et 5.5 mm longa; filamenta glabra, tubo 1.5 mm longo. Discus annularis 0.5 mm altus, fimbriis usque ad 1.5 mm longis. Pistillum glabrum. *Fructus* glabri, 1-spermi.

Typus: *Kostermans 5315* (♀), E. Borneo, Sangkulirang, G. Tepian Lobang, alt. 100 m (Holotype in L; Isotypes in BM, BO, K).

Probably related to *C. pilosum* A. W. Benn.

19. Canarium macadamii, nov. sp. — *Fig. 5 c.*

Arbor magna. Ramuli tenues, scabriusculi, lenticellati; medulla cylindro peripherali e fasciculis vasorum constituto suffulta, fasciculis centralibus plus minusve conspicue quasi-cylindraceis. *Stipulae* petioli basi insertae, lineares, 5—6 mm longae, ut folia et inflorescentiae glabrae. *Folia* 2—4-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jugata. Foliola obliquo-ovata, 12—15 × 6—8 cm, subcoriacea, basis valde inaequilateraliter rotundata; margo integer; apex abrupte breviter (5 mm) obtuso-acuminatus; nervi utrimque 14—16 (angulo 60—70°, in foliorum parte basali usque ad 90°), recti ad subcurvati, prope marginem indistincte ad conspicue arcuatim conjuncti. *Inflorescentiae* ♂ axillares anguste paniculatae c. 12 cm longae. *Flores* ♂ 7 mm longi, breviter pedicellati, extus glabri, receptaculo cavo. Calyx 4.5 mm altus. Filamenta basi subconfluentia. Discus conoideus, 1.5 mm altus, glaber, canali centrali basin versus dilatato et pistillum rudimentarium includente. Calyx fructiger patens triangularis 5 mm diam., lobis reflexis. *Fructus* elliptici, in sectione transversa rotundati, 3.5 × 1.5 cm, apice acuminati, glabri; pyrena laevis; valvae 3 mm crassae. Semen 1; loculi steriles moderatim reducti.

Typus: *J. B. McAdam 206* (♂, loose fr.), NE. New Guinea, Morbe Distr., Wau, alt. 1500 m (Holotype in BRI; Isotypes in L, LAE).

Named in honour of the Australian botanist J. B. McAdam, collector of the type-specimen.

20. **Canarium pilosum** A. W. Benn.

Ssp. **borneensis**, nov. subsp. — *Fig. 5 d.* — *Dacryodes scandens* Husson, Blumea 7 (1952) 164, f. 1. — Differt a ssp. *piloso* praecipue characteribus sequentibus: Stipulae 0. Inflorescentiae angustiores floribus paucioribus. Flores glabri. Pistillum glabrum. Fructus ellipsoidei ad fusiformes, basim et apicem versus angustati, 3.8—4.5 × 1.4 cm.

Typus: *Clemens 40163* (♀, fr.), Borneo, Mt Kinabalu, Penataran basin, alt. 1500 m (Holotype in L; Isotypes in A, BM, BO, G, NY).

Paratypes: Borneo, Mt Kinabalu: *Clemens 31095, 40546, 40599, (herb. BO 125342 & 125456); SF. 26356.*

21. **Canarium pseudosumatranum**, nov. sp. — *Fig. 4.*

Arbor usque ad 50 m × 120 cm. Ramuli robusti c. 12 mm diam., alabastro terminali tomentoso excepto glabri; medulla cylindro peripherali e fasciculis vasorum minutis constituto suffulta. *Stipulae* 0. *Folia* 7—9-jugata, glabra. Foliola anguste lanceolata, 13—20 × 3.5—5 cm, rigido-chartacea; basis subinaequilateralis, rotundata ad subcordata, saepe paulum decurrens; margo integer; apex sensim acuminata, acumine obtuso, tenui, c. 1 cm longo; nervi utrimque 16—20 (angulo c. 55°), recti ad subcurvati, prope marginem valde curvati et inconspicue arcuatim conjuncti. *Inflorescentiae* ♂ axillares, anguste paniculatae c. 20 cm longae, glabrae, rami primarii fere decussati. *Flores* ♂ 7 mm longi, graciles. Calyx 2 mm altus, subglabrus. Petala apicem versus extus subrugosa. Stamina glabra, filamentis inaequaliter confluentibus. Discus tubulosus, 1 mm altus, crasse carnosus,

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Fig. 5. — a. *C. kostermansii* Leenh., leaflet (*Kostermans 5315*); b. *C. maluense* Laut. *f. bullata* Leenh.: 1. leaflet, 2. part of leaflet, upper surface, 3. cross section of fruit (1 from *Brass 12586*, 2—3 from *Brass 13136*); c. *C. macadamii* Leenh., longitudinal section of ♂ flower (*McAdam 206*); d. *C. pilosum* A. W. Benn. *ssp. borneensis* Leenh., fruit (*Clemens 40163*); e. *C. hirsutum* Willd. *var. multicostulatum* Leenh., habit and cross section of fruit (*Beguin 2245*); f. *C. salomonense* B. L. Burtt *ssp. papuanum* Leenh., cross section of pyrene (*Hoogland 3844*); g. *C. cestracion* Leenh., pyrene and cross section of the fruit (*Carr 12796*).

ad orificionem et intus dense pilosus; pistilli rudimentum 0. *Fructus* ovoidei, in sectione transversa circulares, 5 × 2.5 cm, glabri; pericarpium sat crassum; pyrena 6-costata, costis valvarum 3 acutis, costis ceteris 3 obtusis; valvae conspicuae, 2.5 mm crassae. Semina 2; loculus sterilis paulo quam loculi fertiles angustior.

Typus: *KEP. 55781* (♂), Malay Peninsula, Selangor, Kuala Lumpur, Bukit Lagong forest reserve (Holotype in KEP; Isotype in K).

Paratypes: Malay Peninsula: *KEP. 2132, 11599, 20476, 20900, 23087, 71256, 71974.*

Up to now this species was included in the closely related *C. sumatranum* Boerl. et Koord. It differs especially from the latter by its larger fruits (which H. J. Lam, Bull. Jard. Bot. Btzg III, 12, 1932, 474, t. 11 f. 69, described under *C. sumatranum*), as well as by its smaller ♂ inflorescences and different flowers.

22. Canarium vrieseanum Engl.

f. **stenophyllum**, nov. f. — Differt a f. *vrieseano* praecipue characteribus sequentibus: Forma sat robusta. Folia 7-jugata, subglabra. Foliola oblonga, c. 20 × 4 cm, rigida; nervi utrimque 20—26, sat approximati. Infructescentiae compactae 8—15 cm longae. Fructus c. 17 × 12 mm.

Typus: *BS. 49156* (fr.), Mindanao, Davao prov., Mati (Holotype in SING; Isotype in NY).

Paratype: Mindanao, Davao prov.: *BS. 49539.*

Index to scientific names

	Nr
Canarium acutifolium (DC.) Merr. var. **celebicum**	13
— asperum Benth. f. **triphyllum**	14
— australianum F. Muell. var. **glabrum**	15
— caudatum King f. **auriculiferum**	1
— **cestracion**	16
— *commune* (non L.) Auct.	12
— denticulatum Bl. ssp. **kostermansii**	2
— hirsutum Willd.	
var. **beccarii**	17
var. **leeuwenii**	17
ssp. **multicostulatum**	17
— indicum L. var. **platycerioideum**	3
— kaniense Laut. var. **globigerum**	4
Canarium **kinabaluense**	5
— **kostermansii**	18
— **lamii**	6
— **macadamii**	19
— maluense Laut.	
ssp. **borneense**	7
f. **bullata**	7
f. **celebica**	7
— **megacarpum**	8
— **perlisanum**	9
— **piloso-sylvestre**	10
— pilosum A. W. Benn. ssp. **borneensis**	20
— **pseudosumatranum**	21
— salomonense B. L. Burtt ssp. **papuanum**	11
— vrieseanum Engl. f. **stenophyllum**	22
— **vulgare**	12
Dacryodes *scandens* Husson	20

REVIEW

Flower morphology, a source of evidence for evolution as a physiological process

by

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(Rijksherbarium, Leiden)

Evolution has for a century and a half been the subject of both speculation and research. It has been approached from almost every imaginable side. However, while on the one hand the fossil evidence has provided us with the main lines of development both of characters and of taxa, and on the other comparison of living organisms mutually and experiments of various kinds have given us some insight into the processes which may play a part in the mechanism of evolutionary development, the two methods of research are still separated by a wide gap and in spite of many efforts we are far from understanding what is really happening and what the admittedly necessary connection between the framework and the skin may be.

In a recently published book the Swiss artist-botanist Erich Nelson has offered a contribution to the static (or short-time) side of the problem. It must be admitted that his considerations are bearing on a part of the field only (viz. Angiosperm flowers) and that an ample, though by no means exclusive use is made of facts which were already known, this does not lessen the merit of the author that he has contrived to open up a new and promising field of research by expounding a rather bold but consistently argumented theory which seems well worth considering.

Nelson justly points out that traditional morphology seems to be inclined to think of "characters" as constant, static manifestations of the genome. Of course, theoretically everybody knows that this is not so, but it must be admitted that in practice morphology deals with flower parts as organs of a definite shape and position. As will be mentioned underneath similar opinions are expressed by Nelson regarding the genetical side of characters but here, I think, his views are less likely to be generally appreciated. Yet both the morphologist and the geneticist cannot but profit by paying due attention to Nelson's numerous observations.

By these observations the mind of Nelson the artist-painter was extended to that of Nelson the scientist. If I am not mistaken, his original hobby was painting wild flowers (especially orchids), which he did under the benign sun of the Mediterranean and the Near East between 1928—1929. His gift of accurate observation aroused his scientific interest. This made him pursue his observations along logical lines even to artistically less alluring objects and this again made him look for a reasonable explanation of their mutual connections, which ultimately led him up to a theory of comparative flower morphology and organogenesis in particular and of evolutionary mechanism in general. This could, of course, not be attained without a thorough scientific basis and this the author managed to procure during a study of several years at the university of Zürich and elsewhere. Although Nelson has, so far as I know, not been graduated, his book clearly shows that he cannot be considered an amateur; he has happily combined high-standard art with high-standard science.

Without going so far as Markgraf who in the prospectus declares that since Eichler flower morphology has not made any such progress, it must be admitted that our knowledge of intimate flower morphology has been considerably augmented by Nelson's book. Nobody, so far as I know, has ever gone into so much detail regarding shape, colour patterns, and positions of flower plants, their variability and interrelations.

Nelson's material is variability. For him evolution is not accidental, it is primarily a physiological process. It is not a competition between the indifferently developing genome (by haphazard mutation) and selection by the environment; it is a struggle between the genome and "younger formative physiological impulses". Nelson's idea is that the genome is far more plastic than is generally assumed. No or very little appreciation is shown for the idea of an autonomous development of the genome. Mutations, whether or not induced by environmental factors, are supposed to pave the way for the activities of the "physiological impulses" which may, for instance, be caused by positional or nutritional influences exerted by neighbouring organs, and which become gradually genetically fixed and thus represent the evolutionary mechanism (p. 17).

The induced mutations are taking part in the continuation of "orthogeneses" (e. g. series from actinomorphy to zygomorphy, and from Liliiflorae to Orchidaceae, p. 18); the random ones play their part regarding minor characters such as colour patterns, variations in shape and pubescence, etc.. Nelson's theory shows traces of both darwinism and lamarckism, but the latter seems to prevail by a marked tendency to the acceptation of heredity of acquired characters.

In my opinion the most important part of the work is its contribution to flower morphology both by the detailed descriptions and by the beautiful pictures of which a large number (230 out of almost 700) are coloured.

This does not mean that his theory is of a lesser quality. The two cannot be compared but it would seem that the theory, some points of which will be indicated underneath, is still somewhat immature. Both the evolutionary and the genetical basis are insufficiently pondered.

An other weak point is that long range phylogeny has been entirely neglected. This has inevitably influenced some of Nelson's homologisings (stamens, obdiplostemony), which might have turned out differently, had he realised that Angiosperms organs must have had a very long history behind them. He does not express a definite opinion regarding the question whether mutations can result in transspecific (or transgeneric) alterations but he seems inclined to deny this possibility. Should this possibility exist, he says, then the process is necessarily primarily a physiological one: the form is secondary. This is one of the problems which are not sufficiently dwelt upon and they leave the reader unsatisfied.

Numerous morphological problems have been passed in review. Here are some examples giving an idea of Nelson's opinions and conclusions, with some comment of the reviewer (Rev.).

"The" Angiosperm flower is a shortened specialised axis. This shortening results in a close contact of flower parts and this again in a superposition between sepals and stamens, which causes an excessive sectorial tension. Shifting on account of disturbances in the equilibrium of nutricious transport results in a gradually acquired alternation of and equidistance between flower parts (p. 34).

Nelson circumstantially discusses various theories on phyllotaxis (p. 39 ss.), but he fails to mention Plantefol's revolutionary views, which are unfortunately based on but a few selected examples. He denies that in the growth point the limit divergence prevails and only later on leads up to one of the known types of phyllotaxis. He seems to think that in early stages the organ primordia are variably arranged as to local possibilities, including the distribution of organic substances, and that only later on, through continued physiological action, the arrangement of lateral organs gains some regularity though even then local shifting remains possible on the basis of the primordial plasticity. He speaks of "differentiated alternation" as the general principle of what he calls "Gruppenstellung" (aggregation) of organs. These aggregations, brought about by hampering influences by older on younger organs, mean disturbances of the (physiological) equilibrium, which during evolution is getting regulated in various ways.

Deviations of the ideal picture are actually general; in fact the theoretical divergencies are rare, they represent averages or ideal cases; the Fibonacci figures appear everywhere in broken series. Relationships are suggested by transitional series between types. Assuming that such transitional series which can be construed between recent groups and also appear sometimes during ontogeny, have a similar reality in (short-range) phylogeny, the implication is that a phaenotypical alteration in the organisation of a flower has become a genotypical one (p. 78). Nelson's conclusion is that somatic processes ("physiological impulses") have played an important part in these genotypisations (p. 88).

Transitions (ontogenetical and phylogenetical) between helicoid (spiral) and whorled phyllotaxis are possible and can actually be observed in either direction, though helicoid to whorled seems by far the more frequent one, particularly in flowers. Its counterpart is to be found in the transition between opposite cotyledons and spirally arranged leaves (p. 79). It seems questionable, however, that such opposite cotyledons are forming a true whorl; it seems more likely that they form a false whorl, brought about by the lack of space in the seed.

A traditional opinion is that the epipetalous position of stamens of Monochlamydeae is due to the abortion of one whorl of phyllomes. According to Nelson nobody has apparently thought of this kind of superposition as primitive character. He expresses this view and finds support to it in the regularly decreasing percentage of Monochlams for the Cretaceous (p. 33). Here his neglect of long range phylogeny avenges itself. Nelson has apparently not come across those papers, which advocate the axial nature of certain stamens, nor does he quote the reviewer's publications in which the same opinion has been expressed with the suggestion that in these and other cases of stachyospory the stamen is to be considered a fertile axis axillary to a phyllome. Nor does he mention the so far unexplained phenomenon of centrifugal stamens, described by Corner and others. Nelson says that the Monochlams have not yet "invented" full alternation in their flowers.

Yet, wondering what "the" Angiosperm stamen should be considered to represent "organophyletically", Nelson arrives at a conclusion not too much different from that which stachyospory demands. He supposes that filament and connective are a sort of outgrowth of the sporangia or, which is the same in other terms, a sporangium stalk or sporangiophore (p. 94). Even petaloid stamens and petals are not considered phyllomes. All evidence for the latter interpretation is simply argued away. I am afraid he goes a little too far here, but it is interesting to notice that an almost classical view like this still finds an adversary and, for that matter, one from the camp of what I use to call static morphology! Even a proliferated Drosera flower with tentacled leaves instead of petals and carpels cannot convince him that they are phyllomes. I must admit that, to me at least, the argument in favour of the phyllome homology is not a strong one. The fact that small but perfectly developed Drosera leaves are insered above what is clearly a calyx, does not necessarily imply their homology with petals, stamens, and carpels; in fact, they are ordinary leaves.

According to Nelson the sporophyll has contributed nothing or very little to "the" Angiosperm stamen; its plastique is the plastique of the sporangium ("sporangiales Gewebe") (p. 96); filaments and connective protrusions are "secondary structures". Phylogenetically (long range) speaking, this is nonsense, the sporangium does not show a plastique of any importance; as the reader may know, I distinguish sporophylls (phyllomes) and sporogenic axes (sporangiophores) (Rev.).

Nelson refutes the phyllomatic nature of the petals (p. 132 ss). On the strength of numerous examples he concludes that they are generally metamorphous stamens. The enormous plasticity and polymorphy of the corolla can be better understood if we drop the concept of its phyllomatic nature. Petalisation of the stamens is only possible at the cost of the sporangia (p. 148). This is phylogenetically speaking probably a very old and fundamental phenomenon: a telome is, ever since the Devonian, either fertile of sterile (Rev.). The influence of sporangia on the shape of leaves is already discernible in Selaginella, ferns, etc. (p. 269). It also shows in double flowers (Rev.).

The plastique of the corolla is much increased by lateral insertion of the flower and by the acquisition of zygomorphy. Nelson speaks of dorsiventrality but I prefer to reserve this expression for a deplanation in the transverse plane (Rev.). The fact that the calyx is much less involved in zygomorphy than the corolla, is, according to Nelson, due to its "vegetative" character (p. 157).

Differences between terminal and lateral flowers are physiologically determined. Terminal flowers show a closer phyllotaxial relation with the leaves than lateral flowers where the phyllotaxial gap is more sharply marked. This is why in plants with decussate phyllotaxis the terminal flower is more often 4-merous, while the lateral ones are 5-merous (p. 26).

Zygomorphy is extensively discussed (p. 158 ss.). It is both influenced by position (topology) and by gravitation. As a rule zygomorphy is hypotrophic, i. e. the lower side of the flower is furthered (p. 167), but epitrophic zygomorphism, primary or secundary, is known as well. In false zygomorphy (Compositae, Iberis, Viburnum) the plastique is not increased; their androeceum remains actinomorphous (p. 223).

A related phenomenon is the resupination of flowers, notably when they are epitrophically zygomorphous (Orchids) (p. 208).

In peloria atavism is an interpretation of a very relative value only, the main agents being physiological influences. Though this may be true to a certain extent, I am afraid, that Nelson in cases like these as well as in teratology generally minimises the genomatic factors in an inadmissible degree.

Teratisms are primarily explained as being brought about by "morphogenetic substances" (p. 234 ss.). Calycanthemy, for instance, is not an atavism — sepals and petals not being homologous — but is considered a secondary phenomenon induced by physiological action, emanating from the corolla. Nelson speaks here of "Annäherung", meaning the formative influence of one organ on another which is inserted close to it (p. 241).

Nelson considers the Helobiae without much arguing the most primitive Monocotyledons. The latter should have originated "from the Polycarpicae" by the following secondary processes: 1. acquisition of the cyclical arrangement of flower parts; 2. petalody ("korollinische Annäherung"); and 3. acquisition of trimery (p. 266).

His interpretation of the monocotyledonous perigone, though logically following from his circumstantial reasonings, seems rather fantastic: the original condition should be a quincuncial (vegetative) calyx, to which one phyllome is added by the androeceum. He mentions in support of this rather surprising construction a teratism in Lilium in which a terminal flower was found to be quincuncial. Curiously enough Nelson considers this case an avatism (p. 268).

Apparently Nelson rather naively sees the phylogenetical system as a linear arrangement: Pteridophyta-Gymnospermae-Haplochlamydeae-Diplochamydeae (p. 270), but this point is not explicitly stressed and falls outside the real scope of the work.

The tendency of inflorescences to develop into pseudoflowers is brought under the viewpoint of "Annäherung", and the impulse towards the effect mentioned is supposed to emanate from the flowers, no teleological or final factor being involved. The same is assumed for coloured leaves and bracts such as those of Bougainvillea, Cornus, Petasites, etc. There seem to be a correlation between the rise of petaloid bracts and suppression of marginal flowers (p. 270).

"Orthogenesis" is used in the very restricted sense of continuation of a tendency ad absurdum, inside a group of related species, e.g. regarding the lateral lobes of the Ophrys-labellum (p. 276). There seems to be a contradiction here to an earlier statement (p. 18).

The above points, though few in number and only briefly mentioned, may give the reader some idea of the contents of this work which is undoubtedly an important addition to our knowledge of Angiosperm flower morphology. Though, as has been stated above, the theoretical side is perhaps still somewhat immature, it is stimulating in that it evokes self-defense in well-established and generally accepted concepts and draws the attention to a dynamic side of the mechanism of micro-evolution which has so far been all too much neglected. It may arouse new research in the field or morphogenetics and the connected fields of pure genetics and biochemistry.

The book is not easy to read for though the framework has been built up along very logical and consistent lines, the style is often somewhat heavy. Despite this the work is warmly recommended to all botanists interested in problems of phyllotaxis, flower morphology, organogenesis (ontogenetical and phylogenetical), and micro-evolution. It concludes with a bibliography of about 400 titles, which is apparently not complete. European and, in particular, German titles are predominant.

The size is a stout quarto, the print clear, the paper excellent, and the illustrations, particularly the coloured ones admirable, both from an artistic and from a scientific viewpoint, but the price is, in spite of a liberal grant from the "Schweizerische Nationalfonds zur Förderung der Wissenschaftlichen Forschung", so high that it is to be feared that many private botanists have to refrain from purchasing the work. This is the more regrettable since the book is undoubtedly worthy of a wide interest.

If I should appear to have failed in giving it full justice, the author and the reader may blame me for an insufficient insight in some of the fields, which are reaching beyond the scope of the reviewer's specialised study. My main purpose was to draw to Nelson's work the attention it deserves.

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